AVIATION

The Oldest American Aeronautical Magazine

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Major de Bernardi and his Italian Macchi-Fiat after winning the Schneider Cup

VOLUME XXI

NUMBER 21

SPECIAL FEATURES

THE SCHNEIDER CUP RACE
COMMERCIAL AVIATION IN THE NATIONAL DEFENSE
THE WESTBURY LIGHTPLANE CLUB

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NOVEMBER 22, 1926

AVIATION

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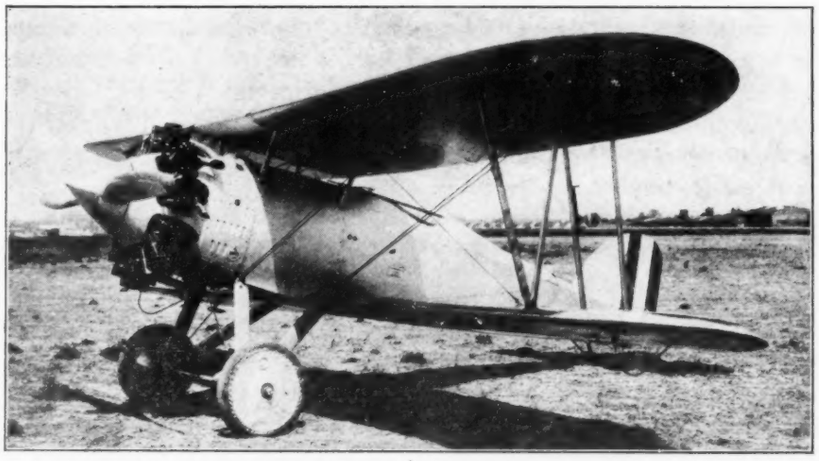

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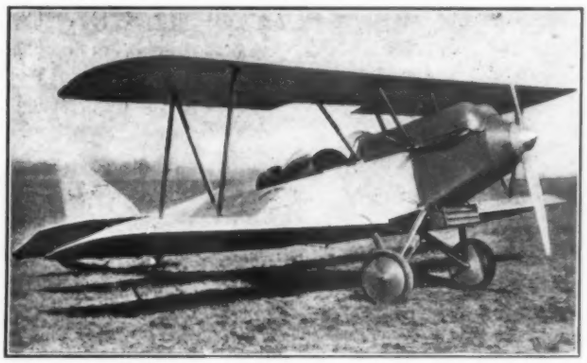

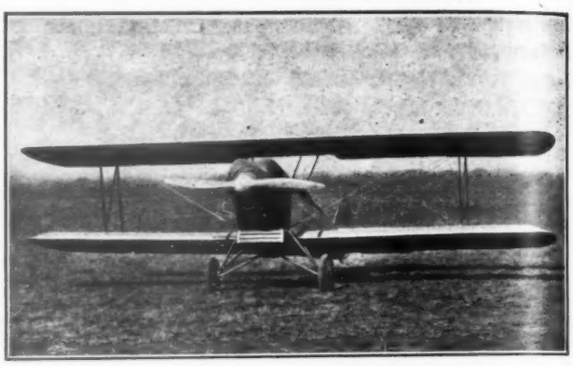

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Italy's Splendid Victory

WHAT WAS in many respects the greatest seaplane contest ever held was the race for the Jacques Schneider Maritime Cup last Saturday at Norfolk, Va., in which Italy defeated the United States in a masterly race during which many seaplane speed records were shattered by both the Italian and the American planes. Major Mario de Bernardi, who won the much prized trophy at an average speed of no less than 246.496 m.p.h. flew a splendid race, but his success was not purely his own. It was the result of the concerted efforts and untiring energy of the entire Italian team, from mechanics upwards, who came to this country with three almost untried speed planes which were very nearly as novel to the Italians as they were to ourselves when we first set eyes upon the beautiful lines of the speedy little Macchi-Fiat machines.

Italy won because her planes were aerodynamically faster than were ours; her engines were more powerful; and her pilots, among the finest in her country, and her mechanics, together worked in unison as one body. Her team work was remarkable and had become a most noticable feature to everyone who went to Norfolk for the race. These accumulated factors all worked together to spell success to her team and the Italians now prepare to carry back to Italy a trophy which they came over to win and which they will now undoubtedly guard with justifiable pride.

From the American standpoint, the Schneider Cup contest has not been lost without many lessons being learned, the value of which will depend entirely upon the extent to which we heed these lessons. In many respects it may be said that the United States has been beaten at her own game. This country has held the World seaplane speed honors ever since Lieutenant Rittenhouse first captured the Schneider Cup from the British at Cowes, England in 1923. Her challengers for these honors have not until now met with much success. Possibly we have been led to sink into the misconception that we needed no special effort on our own part in order to hold this trophy and that the development of our new engines this year would be sufficient to defeat successfully all challengers.

But there is more to it than this. One branch of our air services obviously cannot be entrusted with the defense of our laurels in the air. Last year the Navy's activities in the Schneider Cup contest, quite apart from the fact that she did not win, were a failure. This year conditions were even worse. The Navy looks upon the Schneider Cup contest as a means of training her personnel, as was characterized by the fact that two of our best racing pilots, Navy men, stood by, while a pilot of unquestioned ability but with little or no racing experience was permitted to wreck one of our best planes and narrowly escape with his own life. To win in the future the personnel of both Army and Navy must be made available.

All this points strongly to the fact that it is in private enterprise that we must expect the greatest success. The Italian Air Department, under the direction of Premier Mussolini, ordered the three Macchi racers but left the development of the planes and the management and organization of their national effort in the hands of private enterprise. The race organization was entirely in the hands of the Macchi and Fiat concerns whose products were at stake. Their crews worked in unison. As already mentioned, their cooperation was remarked on by everyone. Italy won the Schneider Cup because of the keen determination of private enterprize. The Italian Government has bought with its money the international prestige in the air which it gained on Saturday when its subjects put up so remarkable a performance.

The United States can, and probably will eventually, do likewise. Some indication of the success which may be gained from the encouragement of private enterprize is even to be found in the details of our own preliminaries for the Schneider Cup contest. Two of America's chief aircraft engine manufacturers were to have had their respective power plants in the race. The Curtiss company was entrusted with the installation of the new Curtiss V-1550 engine in the R3C-4 racer, while the installation and adjustment of the Packard 1A-1500 geared engine in the R3C-3 racer was left to the Navy. What actually happened has a strong bearing upon the point under discussion. The R3C-4, in the hands of the Curtiss company, was being extensively tested some time before the race. Little real trouble was experienced with the plane and engine, while it remained in the hands of the Curtiss company. On the other hand, unofficial World seaplane speed records were set up during the test flights of the plane.

Now, take the case of the Packard engined plane in the hands of the Navy. Little was heard of the machine and no details of any kind were forthcoming before the contest. No results of test flights were announced and it is known that considerable trouble of one kind and another was experienced. Yet the Packard 1A-1500 engine is a tried power plant which is in constant service use and has proved itself as one of the very finest high powered engines in the World. Here, then, may be visualized the two opposites in procedure. Which should we choose in the future?

We need to win the Schneider Cup back from Italy. We need it for our international prestige in the air and we need it as a stimulant of our technical development in aeronautics. Considerable thought, however, must be given to the method of our organization in the future.

The Schneider Cup Race

Italy Wins the Jacques Schneider Trophy at Record Breaking Speed

UNDER perfect weather conditions and viewed by crowds estimated at 30,000 people, Italy won the 1926 Jacques Schneider Cup race on Saturday, Nov. 13, at Hampton Roads, Va., when Major Mario de Bernardi, captain of the Italian team of three planes, flew his Macchi-Fiat racing monoplane seven times around the 50 km. triangular course at an average speed of 246.496 m.p.h. As in last year's Schneider Cup contest, when Lieut. J. H. Doolittle flew a record breaking race in the Curtiss R3C-2 racer, so this year, Major de Bernardi, in even more startling fashion, broke at least four World seaplane speed records when he covered the 350 km. (217.483 mile) course in a total elapsed time of 52 min. 56.22 sec. When it is recalled that the existing seaplane speed record over the 3 km. straightaway, as set up by Lieutenant Doolittle last year, is 245.713 m.p.h., the real significance of Major de Bernardi's performance will be realized, for he covered the entire 350 km. distance of the race, including no less than twenty-one turns, at a speed which shattered Lieutenant Doolittle's World record. Furthermore, Major de Bernardi actually broke this straightaway record on each of his seven laps of the 50 km. course except the first one, during which, apparently, he did not let his engine out fully.

Comparison With Last Year's Figures

An itemized account of Major de Bernardi's performance during the race, compared with last year's contest, is given herewith:

	1925, Lt. Doolittle	*1926, Major de Bernardi*	*Increase*
50 km.	223.157	248.520	25.363
100 km.	234.772	248.189	13.417
200 km.	234.355	248.00025	13.64525
350 km.	232.573	246.496	13.923

The new record of 248.189 m.p.h. for 100 km. represented a combination of Major de Bernardi's fifth and sixth laps. He also flew two other laps—the third and fourth—at an average speed of 247.8115 m.p.h. which, in itself, was a record. The 200 km. record speed was made during the third, fourth, fifth and sixth laps together.

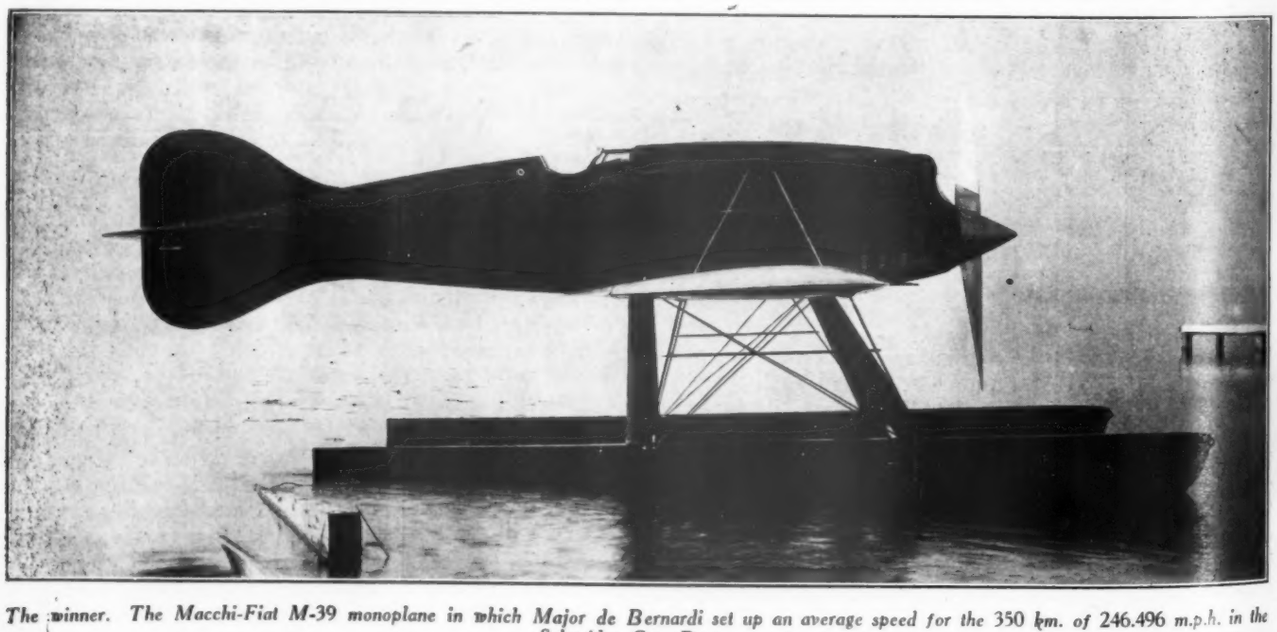
America won second place in the race when Lieut. Christian Frank Schilt, U.S.M.C., flying the R3C-2, last year's winning Curtiss racer, at an average speed of 231.363 m.p.h., or more than one mile per hour slower than the same plane made in last year's contest. It should, however, be remembered that this year's course had two very sharp corners in it and that the reduced average speed was due rather to what may be termed a "slower course" than to any deficiency in piloting. Lieutenant Schilt's corners were very skilfully negotiated with the minimum loss in speed. Lieutenant Schilt's elapsed time for the race was 56 min. 23.96 sec.

Italian Plane Holds Back

Third place in the finish went to Lieut. Adriano Bacula, of the Italian team, flying the Macchi-Fiat monoplane No. 1, at an average speed of 218.006 m.p.h., with an elapsed time for the course of 59 min., 51.30 sec. This apparent marked reduction in the speed of Lieutenant Bacula's machine, which was identical in every respect with that of Major de Bernardi, was due to the fact that Lieutenant Bacula had been instructed to fly the entire race with his engine partially throttled in order to reduce the possibility of his experiencing engine trouble which might force the other two planes of the Italian team out of the race. The object in view was to maintain one Italian which would almost certainly finish and might even be a winner in the event of the other Italian planes or the American machines being forced down and would certainly prevent the not altogether remote possibility of the Curtiss Hawk, flown by Lieutenant Tomlinson, winning due to trouble being experienced by all the other contestants. It developed after the race that Lieutenant Bacula's speed was somewhat slower than he had expected but it made no difference to the results of the contest.

Lieut. William G. Tomlinson, U.S.N., flying a standard service Curtiss Hawk seaplane in place of the Curtiss-Packard racer which was wrecked the day before the race, very naturally finished fourth and last with an average speed of 136.953 m.p.h. and a total time of 1 hr. 35 min. 16.72 sec.

The race itself was without untoward incident with the exception of the falling out of two of the planes, one American and one Italian entry. At the end of his third lap, Capt. Arturo Ferrarin, flying plane No. 5, was forced to land owing to a break in the oil line of the engine of his Macchi-Fiat seaplane. Until then he had been making an average speed of 238.358 m.p.h. for the 150 km. which he completed. This speed, as things devoloped, would have, in all probability, placed him second in the race had he finished, for his nearest contended, Lieut. George T. Cuddihy, U.S.N., flying the R3C-4 Curtiss V-1550 engined racer, made only 237.762 m.p.h. over the first 150 km. of the race. Lieutenant Cuddihy, however, was also forced to retire from the race when, as he was about



The winner. The Macchi-Fiat M-39 monoplane in which Major de Bernardi set up an average speed for the 350 km. of 246.496 m.p.h. in the Schneider Cup Race.

to finish his seventh and last lap, the gasoline supply to his engine was cut off through the pump which brought fuel up from the pontoon tanks failing to function. His engine, though operating perfectly throughout the entire 300 km. and more which he covered, ran dry as he was on the last leg of his seventh lap and Lieutenant Cuddihy was forced to alight in the shipping lanes of Hampton Roads where he was later taken in tow by a naval motor launch. Thus, the plane which represented America's greatest hope of defending the Schneider Cup, though already outclassed in speed by Major de Bernardi's seaplane, was forced out of the contest by what can only be regarded as a minor trouble in spite of the drastic result which it had. Lieutenant Cuddihy would have been a close second had he finished.

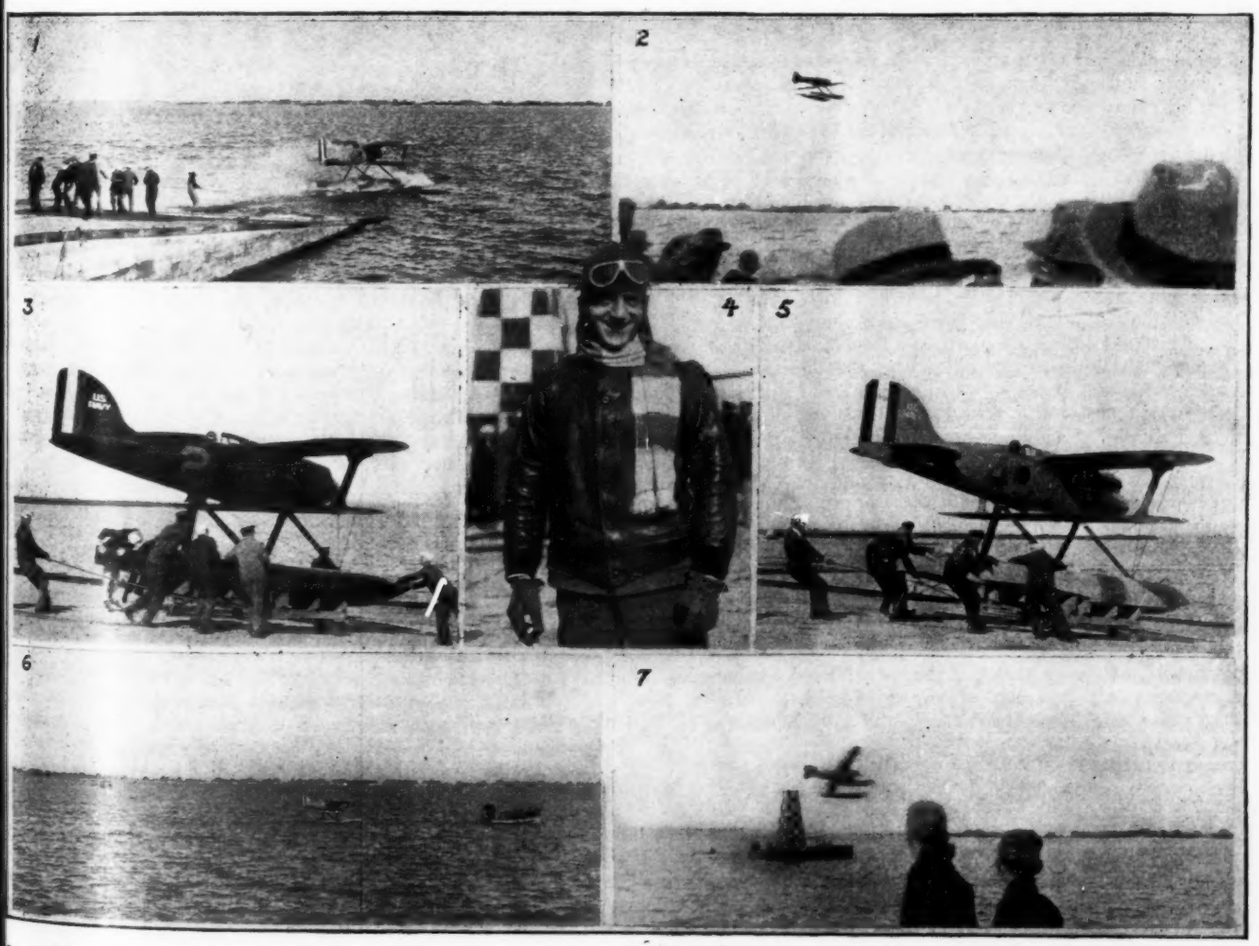
The Start of the Race

The race itself started to schedule without incident. People began to collect on the flying field at the Air Station of the Naval Operating Base, at Norfolk two or three hours before the time set for the start. The home pylon, mounted on a barge, had been towed to a point approximately 100 yd. off the Northeast corner of the flying field which runs right to the water's edge and is built up with a straight six foot drop to the surface of the water. Right on the Northeast corner of the field the timers' stand had been erected with a score board for the recording of lap times. Here, Odis A. Porter, of Indianapolis, had installed his extremely delicate timing instrument consisting of an electric chronograph which is capable of recording to 1/400th of a second. Here, too, the Monroe calculating machine was installed for reducing, as quickly as possible, the times and distances in kilograms to miles per hour speed. The private and public enclosures were arranged such that everybody had a good view and, judging from the number of automobiles and people which crowded the enclosures, interest in the international air race had reached a high degree in Norfolk. In addition, large crowds were reported to have collected at Newport News, one of the turning points, and Old Point Comfort, over which the machines passed in the 24.021 km. straight leg of the course.

Owing to a last minute change in wind direction, instead of the planes taxiing out from the "beach", as the concrete slipways of the Air Station were called, and taking off directly in front of the enclosures and between the timers' stand and the pylon, it was necessary for a new imaginary starting line to be arranged between a mark boat and the timers' stand, allowing the seaplanes to take off directly from the "beach" and continue straight off on the first leg of the race. This arrangement was somewhat unfortunate since it effectively prevented the majority of the spectators from witnessing the take off of each plane, which was certainly one of the most interesting features of the contest.

Service Airplane in Readiness

Shortly before 2:30 p.m., the official time set for the start, a naval HS2-L service flying boat, known as a "fire ship" at the Naval Base, set out to patrol the center of the course so as to be in continual view of the racing machines and be in a position to render assistance at any time when such might be necessary. These machines are fully equipped with fire fighting apparatus and materials, and, as was demonstrated earlier in the week when Captain Ferrarin's engine caught fire during a test flight, are able to render valuable service



Some quick snaps at Norfolk during the Schneider Cup race. 1, Lieutenant Cuddihy going off in the R3C-4; 2, Major de Bernardi crossing the finish line, winner of the trophy at 246 m.p.h.; 3, Lieutenant Tomlinson, in the Packard engined R3C-3, getting ready to take the elimination trials; 4, Major Mario de Bernardi, winner of the Schneider Cup; 5, the R3C-4, with Lieutenant Cuddihy in the cockpit, about to start its elimination trials on Friday; 6, the R3C-4 being towed to its mooring for the water tightness test; 7, Lieutenant Tomlinson, flying the Curtiss Hawk past the home pylon.

in passing a fire extinguisher to the pilot of the striken plane and in rendering other aid. This HS2-L boat remained out during the entire contest, circling again and again in the center of the triangular course so as to be out of the way of the racing planes but, at the same time, in a position to view their progress at all times.

First Man Off

Lieutenant Bacula began warming up the engine of his Macchi-Fiat plane, No. 1, at about 2:28 p.m. and was let down the slipway at approximately 2:35 p.m. when he taxiied rapidly across the starting line, which had to be passed on the water, and quickly climbed out into the air. His actual take off took from 20 to 30 seconds, which was about the time taken by all three of the Italian planes while the American racers took a little longer than this to leave the surface of the water. Another interesting feature of the take off of the little Macchi monoplanes, all three of which were identical in every respect, was the very smooth manner in which they rode the water at high speed and the comparatively small amount of spray set up. Of course, there is a very considerable disturbance and spray when any object moves through water at a speed of anything from 60 to 90 m.p.h., the propellor of a plane, itself being responsible for throwing up a considerable amount of water. But, compared with the American racers, the Italian machines were very steady indeed during the taking off, the most noticeable feature being the entire absence of the somewhat violent pitching motion characteristic of the take off of the American racers.

The second plane to leave was the Curtiss Hawk piloted by Lieutenant Tomlinson, who crossed the starting line at 2:38 p.m. Shortly after Lieutenant Tomlinson had left, Lieutenant Bacula's machine again came into sight far out on the horizon, speeding along the 24 odd kilometer straight leg of the course in the direction of the Newport News turning pylon. The next plane due to leave under the schedule of one machine starting every five minutes, was No. 3, the Macchi racer piloted by Captain Ferrarin, who, apparently was having some trouble in warming up his engine. There was some delay and, not waiting for Ferrarin, Lieutenant Cuddihy in Plane No. 4, the all-blue Curtiss R3C-4 racer with the 700 hp. Curtiss V-1550 engine, started off across the starting line and took off shortly after the drop of the starter's red flag in the mark boat. One minute after Cuddihy had left, Ferrarin, in the Macchi, took off. By this time Lieutenant Bacula had completed his first lap at an average speed of but 209.584 m.p.h., which caused some surprise among the spectators since, at that rate he was not coming anywhere near Lieutenant Doolittle's winning speed of last year. Few were, however, aware at that time of the plan to have Lieutenant Bacula hold back his speed and thus conserve his engine. Lieutenant Tomlinson completed his first lap at 2:53 p.m. at an average speed of but 137.312 m.p.h. and was quickly followed by Lieutenant Cuddihy in the R3C-4 at about 2:54 p.m. at an average speed of 232.427 m.p.h.

Bacula's time on the second lap was 213.425 m.p.h., about four miles per hour faster than his first circuit. But real excitement among the crowd was evident when the announcer from the timers' stand, T. T. Hildebrandt of Baltimore, who has a voice like thunder through the megaphone, announced Captain Ferrarin's first lap speed as 234.631 m.p.h., or about two miles per hour faster than the speed of the R3C-4, America's best plane.

The Italian Captain Leaves

Major de Bernardi, captain of the Italian team, took off at about 3:00 p.m. and was followed a minute later by Lieutenant Schilt, of the Marine Corps, flying last year's winner, the Curtiss R3C-2. Almost at the same time, Captain Ferrarin returned on the start of his third lap flying at about 200 ft. and streaming out dark smoke from the exhausts of his plane, which was a feature characteristic of each of the three Italian machines. Returning on his second lap, Lieutenant Cuddihy's speed was chalked up as 236.180 m.p.h., which raised the hopes of the American contenders for it was four miles per hour faster than the speed he had made on his first lap. However, when Captain Ferrarin returned on his second lap it was found that he, too, had increased his speed average for the first 100 km. by about four miles per hour, his average being 238.748 m.p.h. And it was in this manner that the enthusiasm and excitement among the spectators grew.

However, the first real intimation of the race being an Italian one was given when Major de Bernardi completed his first lap and a speed of no less than 239.443 m.p.h. was chalked up on the score board. In the meantime Lieutenant Cuddihy was increasing his speed average by about one mile per hour on each of his successive laps, while Lieutenant Schilt was making around 230 m.p.h.

Major de Bernardi being carried shoulder high from his plane after his victory in the Schneider Cup race. Signor Mario Castoldi, designer of the Macchi monoplanes, will be seen in the extreme left, while in uniform on the right is Comdr. Silvio Scaroni, Italian Air Attache

At the conclusion of his third lap, when he had done 238.358 m.p.h. for the 150 km. he had already covered and when he had actually made 243.012 m.p.h. in his second 50 km., Captain Ferrarin crossed the pylon with his engine obviously not operating satisfactorily. The wisdom and good judgment which had characterized the actions of the Italian team from the day of its arrival in this country was again evident as Captain Ferrarin left the course and circled out beyond the hangars, coming around and into a landing up wind with his engine ticking over. It developed that an oil line had broken, with the result that his engine was without lubrication and, rather than take absurdly unnecessary risks, Captain Ferrarin had retired from the race with his engine and plane still in good condition. He landed at about 3:14 p.m. having been in the air a total of 23 min. 37.21 sec.

Up until then, with Major de Bernardi doing 244.946 m.p.h. as the average for his first three laps and Captain Ferrarin at a little over 238 m.p.h., it looked very much as though first and second place in the race were going to Italy. The retirement of Ferrarin, however, put Lieutenant Cuddihy in the running for second place and first, in the event of Major de Bernardi experiencing trouble such as his team mate had done. Up to the fifth lap, Lieutenant Cuddihy had done an average of 238.791 m.p.h., his speed for the fifth lap itself being as high as 242.160 m.p.h., the highest speed set up by the American team in the contest.

It was very noticeable how very much wider the Italians were taking the home pylon than were the American pilots. All three American pilots cut around the home pylon, which was the widest, and therefore, easiest angle in the course, quite close, between the timers' stand and the pylon, Lieutenant Tomlinson, in the Hawk, naturally cutting closer than all the others. But the Italian pilots chose to fly very wide all the time and in some cases were probably 200 yd. or so from the pylon. It is probable, in fact, that Major de Bernardi's speed for the course might have been very much higher had he flown closer in.

In the meantime, Lieutenant Schilt was coming around regularly, bringing his average speed up to 231.173 m.p.h. on his sixth lap. His fastest single lap was No. 4, which he completed at 233.164 m.p.h. However, Lieutenant Cuddihy had failed to return at the end of his seventh lap and, fearing a mishap, several Navy motor boats set out in the direction of Hampton Roads, where they quickly found Cuddihy,

Wide World Photo

A section of the crowd which viewed the Schneider Cup race from the flying field at the Naval Base, Norfolk, Va.

in the R3C-4 racer, floating about with a dead engine, the reasons for which have already been given, and took him in tow. Cuddihy came down at approximately 3:45 p. m., having been in the air 46 min. 65.63 sec. Meanwhile, Lieutenant Bacula, the first to start, had finished the race at an average speed of 218.006 m.p.h.

A close examination of Major de Bernardi's accumulative average speeds shows that he gradually increased lap by lap. However, his fastest single lap was No. 3 which he covered at 248.520 m.p.h. On his sixth lap, as he passed the pylon, it was noticed that he was flying at a considerably higher altitude than he had done previously. It developed after the conclusion of the race that his lubricating oil had overheated and he had decided to rise to somewhere around 600 ft. in an effort to cool off his engine. On his last lap, however, Major de Bernardi came down low again a shot across the finish line at 247.207 m.p.h.

Lieutenant Schilt came in third to the finish and Lieutenant Tomlinson, in the Hawk, last and almost a full lap behind.

Thus, at a speed of more than 4.1 miles per minute, Italy won the 1926 Schneider Cup race, in the most interesting, and in some respects, remarkable international airplane contest which has ever been held. Italy's win was the result of the superiority in design of her planes over the American machines and the excellent team work which was so characteristic of the entire Italian party from the mechanics upwards. It was a race well won and well deserved.

The complete results of the race by laps, in the form of accumulative average speeds and lap speeds, are given in the following table:

ACCUMULATIVE AVERAGE SPEEDS BY LAPS (M.P.H.)

Lap	de Bernardi Macchi-Fiat	Schilt R3C-2	Bacula Macchi-Fiat	Tomlinson Hawk	Cuddihy R3C-4	Ferrarin Macchi-Fiat
1	239.443	224.172	209.584	137.312	232.427	234.631
2	243.197	228.046	213.425	139.340	236.180	238.748
3	244.946	229.642	214.949	139.598	237.762	238.358
4	245.482	230.512	216.827	138.878	237.965	.....
5	245.959	230.853	217.526	138.612	238.791	.....
6	246.378	231.173	217.198	137.570	239.191	.....
7	246.496	231.363	218.006	136.953	.....	.....

LAP SPEEDS (M.P.H.)

Lap	de Bernardi Macchi-Fiat	Schilt R3C-2	Bacula Macchi-Fiat	Tomlinson Hawk	Cuddihy R3C-4	Ferrarin Macchi-Fiat
1	239.443	224.172	209.584	137.312	232.427	234.631
2	247.071	232.056	217.410	141.429	241.611	243.012
3	248.520	232.902	218.062	140.116	240.991	237.582
4	247.103	233.164	222.664	136.763	238.575	.....
5	247.886	232.225	220.370	137.557	242.160	.....
6	248.492	232.785	215.574	132.587	241.199	.....
7	247.207	232.514	222 979	133.366	.....	.....

Apart from the large crowd of spectators in the public enclosure, many notable figures in both American and foreign aviation were to be seen in the private enclosure. Among these may be mentioned General Augusto Villa, Italian Military Attaché; Comdr. Alberto Lais, Italian Naval Attaché, and Madame Lais; Comdr. Sylvio Scaroni, Italian Air Attaché; Comdr. Georges Thenault, French Naval Attaché; Wing Comdr. T. G. Hetherington, R.A.F., British Air Attaché, and Mrs. Hetherington; Lieut. Yama Moto, Assistant Japanese Naval Attaché; Secretary of the Navy, Curtis D. Wilbur; Assistant Secretary of the Navy for Aeronautics, Edward P. Warner; Attorney General of the United States, John G. Sargeant; Rear Admiral William A. Moffett, Chief of the Bureau of Aeronautics; Frank H. Russell, vice-president of the Curtiss Aeroplane and Motor Company; Major C. M. Young, of the Aeronautics Branch, Department of Commerce; C. G. Peterson, assistant to the president, Wright Aeronautical Corporation; Grover Loening, president of the Loening Aeronautical Engineering Corporation; Clerburne Eberhart, president of the Eberhart Aeroplane and Motor Co.; T. Z. Fagan, vice-president of Scintilla Magneto Co., Inc.; R. J. Hurley, engineer of the B. G. Corporation; Major Temple Joyce, of the Curtiss Aeroplane and Motor Co.; Arthur Nutt, chief engineer, power plant section, Curtiss Aeroplane and Motor Co.; T. M. Wright, chief engineer, airplane section, Curtiss Aeroplane and Motor Co.; Casey Jones, Curtiss Flying Service, Inc. Many arrived by airplane and there were a large number of commercial airplanes to be seen in that section of the flying field reserved for these machines. Among those who arrived by airplane, but who was unable to stay in Norfolk for the actual race, was Charles L. Lawrance, president of the Wright Aeronautical Corporation. Mr. Lawrance flew down from Paterson, N. J. in the Wright company's service plane.

The Banquet

The National Aeronautical Association officially turned over the massive Schneider Trophy representing Zephyr kissing the waves, to the Italian team at a very successful banquet held at the Hotel Montecello, Norfolk, on the night of Nov. 13. Approximately 300 attended the function and cheered Major Mario de Bernardi, captain of the Italian team and the winner of the trophy, as he stood to receive the gold plaque as a symbol of his splendid performance in the race, and the Schneider Trophy for his team and his country. In reply to the ovation, Major de Bernardi spoke in his native tongue and Comdr. J. L. Callan, U.S.N.R., who has been on duty as liaison officer with the Italian team ever since it arrived in this country, and has been a much needed friend with the Italian fliers at all times, interpreted what Major de Bernardi had said. Incidentally, recalling the tremendous amount of talking which has been going on between these good natured Italian fliers and the many visitors to Norfolk, both ladies and gentlemen, (with particularly reference to the former) it is almost incredible to think of the hard time Commander Callan must have "suffered," doing of necessity, fully twice as much talking as anybody else.

The Winner Speaks

Returning, however, to the banquet, Major de Bernardi complimented and thanked the staff of the Naval Base and the civilian population of Norfolk for their assistance and hospitality and, as the true soldier he is, gave due credit to his comrades who took part in the event. "We have not come here merely to defeat the Americans in the race," he said, "but also to renew and continue the friendly relations between the two countries". H. H. Rumble was toastmaster at the banquet and among the speakers may be mentioned Attorney General Sargeant, Asst. Secretary Edward P. Warner, Rear Admiral Robert E. Coontz, commandant of the Fifth Naval District, and Porter H. Adams, president of the National Aeronautic Association, who presented the trophy and plaques. Lieut. C. Frank Schilt received a silver plaque.

Signor Castoldi, the designer of the Macchi monoplane racers was at the banquet and received the highest praise for his achievement, as did also Signor Ferretti, the designer of the remarkably efficient Fiat engines installed in the planes.

Preliminaries to the Schneider Cup Race

Elimination Trials of the Racing Planes Give Indication of Closeness of Contest to Follow

THE DELAY of the Schneider Cup race for two days from Nov. 11 to Nov. 13 was due to the decision of the Contest Committee, after a joint meeting on Nov. 10 with the pilots of both teams, that the weather conditions were such as to entail a serious risk to the pilots, during the navigability tests. The suggestion that the race itself be postponed one day had several disadvantages, none the least significant of which was the probability of its being impossible for the tests to get under way before the late afternoon of Thursday when the wind had dropped and the possibility of only one or perhaps two of the planes of each team being qualified owing to shortage of time. The general concensus of opinion was that it was infinitely preferable to have the race on Saturday, which was a half holiday, and have all six planes entered than to hurry it off on Friday with Italy and America, the two competing nations, only partially represented.

The decision proved a wise one for it was not until shortly after 4:00 p.m. on Thursday that the wind had dropped sufficiently to permit the little speed seaplanes a fair chance of completing the navigability and watertightness trials. And even at that, there was only time before dark for two machines, one Italian and one American, to go through the navigability tests and be moored out for the six hour watertightness test.

Elimination Trials

Accordingly, at 4:15 p.m. on Nov. 11, plane No. 5 one of the Italian Macchi-Fiat monoplane racers, with Major Mario de Bernardi, captain of the Italian team, piloting, set out across Little Bay from the Naval Air Station and rose gracefully into the air for its navigability trial. The test consists of a short flight followed by a landing and taxiing over the water for a distance of at least half a mile at a speed of more than twelve knots. This test had to be repeated once according to the rules. There was no time limit on the length of the flights and, therefore, pilots took the advantage of giving their planes a brief try out as this trial represented the last time the machines would be in the air before the actual race. After the navigability trial each plane had to be moored out for a period of six hours unattended.

Major de Bernardi carried out his navigability flights without incident. The quick take off of the Macchi planes, which was characteristic of all three of the Italian racers, was very noticeable. The pontoon design of the Macchi racers was somewhat different from that of the Navy pontoons fitted to the Curtiss racers. Whereas the bottoms of the American pontoons were what might be described as square Vees having flat sides, the Italian pontoons were designed with a very sharp concave sided Vee bottom. This appeared to have the effect of greatly reducing the spray set up during taking off and landing and, furthermore, it was very noticeable that the Italian machines rode very smoothly over the water whereas the American planes tended to pitch somewhat, although it must be remembered that the water in Little Bay during the trials was by no means calm.

Italian Plane Damaged

Major de Bernardi was not up very long on his trials for the time was getting late and it was growing dark. He came in to land and a naval motor launch went out to tow him to his mooring in front of the Italian hangar, which was situated at one end of the "beach" at the Air Station, whereas the American planes were placed in a section of what appeared to be the assembling hangar at the opposite end. Through an unfortunate accident, the motor launch, in getting a line to Major de Bernardi in the Macchi, ran into his starboard pontoon and punctured it so that it became necessary to bring the plane as quickly as possible to shore. In view of the fact that the accident was due to the carelessness of an entirety outside party to the race, the Contest Committee of the N.A.A. decided that the rules regarding the navigability trials in this respect might be waved and the Italians were permitted to repair the pontoon and replace the plane in the water the next morning for the mooring out and watertightness test. The industrious Italian mechanics worked all Thursday night at the pontoon and, rather than replace the damaged float with a spare one which they had, they repaired the damage and by morning it was impossible to tell that the pontoon had sustained any injury whatever. The machine was put in the water the next morning and satisfactorily completed its six hour watertightness test.

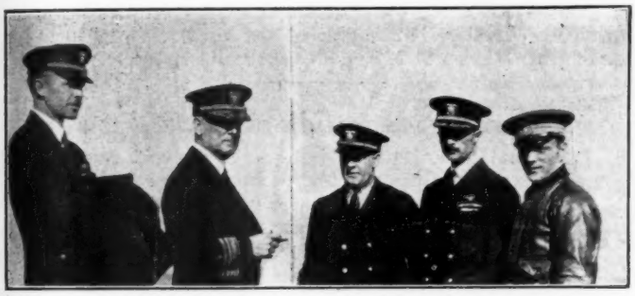
The Jacques Schneider Maritime Cup

Going back to the activities of Thursday evening, while Major de Bernardi was carrying out his trials, Lieutenant Cuddihy took out the Curtiss R3C-3 racer with the geared Packard engine. He was not, however, out entering trials but was merely giving the engine a trial run prior to the plane carrying out the actual elimination tests the next morning. The purpose of the trial was largely to test out the propeller since it had been straightened after having been bent the day before by water thrown up into the propeller disc during trials in the rough water. In order to avoid the possibility of again damaging the propeller from the same cause, Lieutenant Cuddihy cut his engine just prior to landing and many gained the impression that he had experienced engine trouble. This, however, was not so.

While this activity was going on, Lieutenant Schilt, detailed to fly No. 6, the Curtiss R3C-2 with the Curtiss V-1400 engine, with which Lieutenant Doolittle won the Schneider Cup last year at Baltimore, took his machine out for the elimination trial and satisfactorily completed the navigability test and was duely moored out for the watertightness test. Lieutenant Schilt left at about 4:45 p.m. and three minutes later Lieutenant Bacula, of the Italian team, went up in his Macchi-Fiat for his trials. In the fading light, the two planes, one, the American biplane racer and the other, the Italian monoplane painted pure scarlet, as were all the Italian planes, presented a very striking spectacle. Both planes were taken in from their mooring tests at about 11:00 p.m. that night.

At about 5:15 p.m. when the light was really getting dim, Lieutenant Ferrarin, desirous of completing his trials that evening and anxious to have the advantage of a mooring out test at night when the possibilities of calm water were better, decided to start his trials. Accordingly, the big Fiat engine of his Macchi monoplane was warmed up and Lieutenant

Ferrarin sped out across Little Bay. He satisfactorily completed his first flight and alighting but when out on his second flight he failed to return and, fearing he had been forced down, a motor launch from the Naval Base set out in the direction of Chesapeake Bay, quickly followed by one of the HS2-L service flying boats, piloted by Aviation Pilot Patrick J. Bryne. The latter very soon spotted Lieutenant Ferrarin floating around among the shipping in Hampton Roads with a dead engine. By that time it was almost entirely dark. Moreover, neither Pilot Bryne nor Captain Ferrarin could understand each other. Fearing that the little Macchi monoplane might get run down by one of the many passing vessels, tug boats, passenger boats and ferries, Pilot Byrne proceeded to run circles around the Italian plane, taxiing around and around for over two hours. With considerable ingenuity Pilot Bryne, realizing that neither he nor the Italian had any lights whereby they could be seen, for it was now quite dark, so manipulated his fuel mixture that his engine spat fire from its exhaust ports whenever a vessel came in sight and approached close at hand. The method appeared to be perfectly effective in indicating the presence of the planes on the surface to any passing ships until, almost two and a half hours later, the naval motor launch arrived and took the Italian racing plane in tow, and brought it safely back to the Air Station.



At Norfolk for the Schneider Cup Race. Left to right: Comdr. H. C. Wick, U.S.N., captain of the American team; Rear Admiral William A. Moffett, U.S.N., chief of the Bureau of Aeronautics; Lieutenant Bergen, U.S.N.R., one of the Judges; Comdr. J. L. Callan, U.S.N.R., liaison officer for the Italian team; and Major Mario de Bernardi, captain of the Italian team.

This concluded the flying activities for the day. Everything had gone off fairly satisfactorily. The pontoon of the Italian plane No. 5 was already undergoing repair and members of the Italian team were working hard on Captain Ferrarin's engine to get it in order for trials the following day. The only dissatisfaction and uncertainty that existed was in the American camp, where no final decision had been reached regarding the pilot who was to take the place of Lieutenant Conant who was killed in a flying accident two weeks ago. Lieutenant Conant was scheduled to fly the R3C-4 racer with the new Curtiss V-1550 engine of 700 hp. His death left one of the best planes in the American team without a pilot. Lieutenant Cuddihy had flown the R3C-4 earlier in the week and had put up an unofficial record speed of 256 m.p.h. Lieutenant Conant himself had flown the machine at 251 m.p.h. It was not surprising, therefore, that considerable faith was being placed in this machine. The Packard engined machine was not ready for flight tests as soon as the Curtiss machine was, with the result that not so much had been heard of this plane. Nevertheless, according to Admiral Moffett, the Curtiss R3C-3 with the geared Packard 1A-1500, 700 hp. engine had made 258 m.p.h. over a straight course of 1400 yd.

The Question of Pilots

Of the three alternate pilots selected for the Schneider Cup team, Lieut. C. C. Champion, Lieut. W. G. Tomlinson and Lieutenant Henderson, Lieutenant Champion was first named as the Navy's selection to replace Lieutenant Conant. Yet, as the day of the race approached it became increasingly apparent that Lieutenant Champion would not fly in the race. While all three alternate pilots may be numbered among the best pilots in the Navy and all are experienced in pursuit plane flying, none of them has had much experience in high speed racing planes. Although it had been officially announced that Lieutenant Champion would fly in the Schneider race, the official position of Thursday evening was that it would be decided by 9:00 a.m. on Friday morning who was to fly the Curtiss engined plane, the R3C-4. Actually, it was never announced who was to fill the vacated place in the American team instead of Lieutenant Champion. On Friday morning it was stated that Lieutenant Champion was not well, and the first intimation on the allocation of pilots was only forthcoming when, with both the Packard and the Curtiss engined racers out on the "beach" early on Friday, with their engines ticking over and warming up, Lieutenant Cuddihy arrived and seated himself in the cockpit of the R3C-4, and Lieutenant Tomlinson, duely photographed, climbed into the Packard engined R3C-3.

Cuddihy Flies the R3C-4

Lieutenant Cuddihy was lowered down the slipways and went off for his navigability trial. The weather was almost ideal with a gentle breeze and a brilliant sun. Cuddihy, who has had extensive experience in flying the Curtiss racing planes since 1924, made a perfect take off and climbed steeply into the air. He circled around over the hangars in a steep bank for a few minutes and then came in for the first taxiing test, again taking the air and repeating the process, after which he was taken in tow by a launch and moored about 300 ft. from the shore in front of the American hangar.

In the meantime, Lieutenant Tomlinson was preparing for his trials. The wind was blowing almost due East and Tomlinson, leaving the slipway, started off well into the wind. In taking off, however, he bounced badly, due undoubtedly to his being unaccustomed to this type of plane. The Curtiss seaplane racers have a characteristic pitching motion when taking off which must be most disconcerting to the pilot, no matter how skillful he may be in handling the more usual classes of planes, if he is not accustomed to it. Lieutenant Tomlinson had a very narrow escape from over-turning when taking off. Once in the air, however, he flew perfectly and remained up for probably 30 minutes or more. Then he came in to alight and was just coming over the edge of the flying field when a CS plane operating from the station at the time, got in his way. A pilot can see little from these small racing planes and his troubles must be bad enough without his being worried by having to dodge service machines which could just as well have remained out of the air during the hour or so that the racing planes were flying.

The Wreck of the R3C-3

Accordingly, Lieutenant Tomlinson went around again for another alighting. This time he came in well but, as far as could be seen by the spectators on the "beach," he misjudged his distance above the water and "alighted" about two feet above the water. The plane dropped and bounced, doing damage which afterwards proved to be a large hole in the bottom of the starboard pontoon. The plane bounced off and when it again touched the water, it naturally began to sink on the right hand pontoon. Lieutenant Tomlinson still had considerable headway, possibly as much as 50 or 60 m.p.h., and he undoubtedly attempted to raise his dropping wing tip instinctively with the aid of his ailerons. Immediately, the plane appeared to do a side sumersault over to the left and turned completely over before the pilot had time to release himself. Lieutenant Tomlinson was exceedingly fortunate for, in spite of the fact that the plane immediately settled down until only the bottoms of the two pontoons were visible on the surface, he was able to extricate himself and within a few seconds was sitting on the top of one of the pontoons waving to the shore to reassure those few on the "beach" who witnessed the incident, that he was safe. The accident occurred about 300 yd. off the shore in Little Bay and a HS-2L flying boat happened to be on one of the slips with its engine ticking over and this immediately set off and was the first to reach Tomlinson who was quickly brought to shore and found to be suffering from nothing worse than a little shaking up and being thoroughly wet and cold. The wrecked seaplane was later salvaged.

This ended the morning's proceedings as far as Schneider Cup flying was concerned. Major de Bernardi's Macchi which had suffered a damaged pontoon the evening before

had been repaired overnight as already recorded and completed its mooring out test during Friday morning. In the early afternoon Captain Ferrarin took his Macchi-Fiat racer out for the trials, his engine operating perfectly. By this time more spectators had arrived, mostly of the flying fraternity, and all who had not already seen one or the other of the Italian entries in the air were very impressed, not only with the excellent flying qualities of the little Macchi-Fiat monoplane and its apparent speed, but with the masterly manner in which Captain Ferrarin handled his little scarlet racer.

Captain Ferrarin did not stay up long and shortly after he had landed and was moored Lieutenant Tomlinson appeared again at the station in flying clothes and took up a standard Curtiss Hawk (Curtiss D-12) seaplane which, it had been decided, he would fly in the race the next day as a sort of standby, the Navy apparently recalling the fable of the race between the tortoise and the hare. Judging by the type of flying indulged in by Lieutenant Tomlinson during his navigability trials in the Hawk, he had suffered little from his experience of earlier in the day. He put up about the finest show of trick and fancy flying that the spectators had seen for a long time. All this, as part of the navigability tests of his Hawk, not only served the purpose of qualifying the machine for the race the following day but apparently put Lieutenant Tomlinson back in his old good spirits. Later in the day each of the pilots, both Italians and Americans, went up in a Vought UO to fly the course and accustom themselves to the landmarks. And so ended the preparations for the strenuous race for international seaplane speed honors which was to take place the following day.

Cuddihy's Engine Functions Perfectly

While the Curtiss V-1400 engine in the R3C-2 racer, piloted by Lieutenant Schilt to second place in the Schneider Cup race, functioned perfectly throughout the entire 350 km. of the course, many have been put under the impression that the Curtiss V-1550 engine in the R3C-4 racer, flown by Lieutenant Cuddihy in the contest, developed trouble which finally resulted in his being forced down when he was about to enter the last leg of the last lap of the race. It is, therefore, of extreme interest and very great importance to know that Lieutenant Cuddihy's engine stopped merely because of the failure of the pump which should have supplied gasoline from the pontoon tanks and that the engine just ran perfectly dry.

What actually happened was this. On the day before the race, the gasoline pump, which was intended for the purpose of pumping up gasoline from the pontoon tanks into the main tank, was found to stick. It was a standard Naval Aircraft Factory pump. It was then decided to change this pump and to replace it with another, identically similar pump which Lieutenant Cuddihy brought down from the Naval Aircraft Factory in case of emergency. The new pump, when installed, was thoroughly tested and was found to work satisfactorily.

Lieutenant Cuddihy started the race feeling satisfied that everything was working well. On the third lap he noticed his gasoline guage down to 25 gal. and, accordingly, commenced to operate the pump to bring fuel up from the pontoons. But the guage still showed the quantity of gasoline in the main tank to be decreasing and Lieutenant Cuddihy pumped harder. The pump was not, apparently, having the slightest effect and the engine of the R3C-4 stopped dry and Lieutenant Cuddihy made an alighting down wind with a dead engine after he had done 2/3 of the last lap and was within sight of the winning post with a close second place in the race. Some idea of how hard Lieutenant Cuddihy, who flew a perfect course throughout the race, must have worked at the pump could be gained from the condition of his right hand which was so blistered and swollen that he could in no way use it. Nevertheless, the pontoon tanks of his plane were full at the end of the race.

The Curtiss V-1550 engine in the R3C-4 racer was, as a matter of fact, working better than ever before. On the morning of the race, during a test, it was found that the engine was turning up several hundred revolutions per minute more than normal and, accordingly, the 9 ft. 1 in. propeller then fitted, was replaced by a spare propeller of 9 ft. 4 in. diameter. This left the engine developing maximum power at 2,600 r.p.m.

Some Equipment Details

It is of considerable interest to note that all the propellers which flew in the Schneider Cup race were of the Reed forged duralumin type, with the exception, of course, of that fitted to the Curtiss Hawk which was a standard Curtiss-Reed slab propeller. The propellers on the R3C-2 and the R3C-4 were Curtiss-Reed forged R type duralumin propellers while the propellers of the Macchi-Fiat monoplane of the Italian team were also forged propellers designed by Dr. A. S. Reed.

Another interesting feature of equipment is the fact that the new B.G. Midget spark plugs were used by the Italians in all their planes. Incidentally, these plugs were also employed on the V-1550 Curtiss engine of the R3C-4, which performed so well. These plugs are particularly notable for their light weight and, when installed in an engine, ease in starting.

The V-1550 Curtiss engine employed a Splitdorf magneto, while the Curtiss D-12 engine of the Hawk, in common with nearly all service D-12's, had a Scintilla magneto.

Curtiss Congratulates the Italians

After the Italian success in the Schneider Cup race, the Curtiss Aeroplane and Motor Company sent the following letter to Signor Muzio Macchi, a son of the constructor of the Italian planes, who was over here to view the race. The letter was dated from Garden City on Nov. 15:

My Dear Signor Macchi:

Will you be good enough to accept for your company, the Socieda Ananyma Fiat, Major Mario de Bernardi, and his associates, the hearty congratulations of the Curtiss organization on the winning of the 1926 Schneider Cup Race.

The superb performance of your equipment and the close cooperation of your personnel brought you success.

Our hats are off to you!

(Signed) Frank H. Russell,
vice-president,
Curtiss Aeroplane and
Motor Co. Inc.

N.A.A. Congratulates Italy

As soon as the Schneider Cup race had concluded with a win for Italy, Porter Adams, president of the National Aeronautic Association sent N.A.A. congratulations to Italy in the following cable:

Premier Mussolini
Rome, Italy,

National Aeronautic Association Congratulates Italy on its great victory in the Schneider Cup Race and on the splendid sportsmanship of its representatives.

(Signed) Adams,
President.

Germans Reduce Price of Motor Fuel

The prices for motalin the anti-knock fuel of the I. G. Farbenindustrie A. G., have recently undergone a considerable reduction. As far as price is concerned the difference between ordinary automobile gasoline and motalin at present is hardly worth considering. Compared with benzol or mixed benzol and benzine, it is stated that motalin is now so cheap that its employment instead of the other products mentioned means a very material reduction of the expenses in driving a motor car.

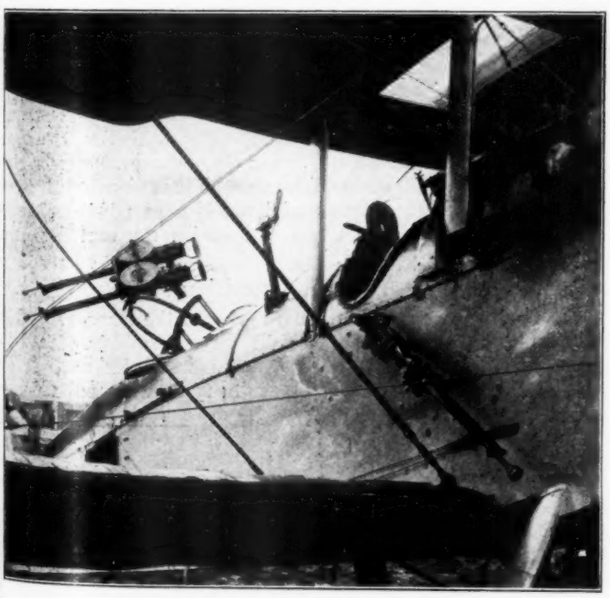
Commercial Aviation In the National Defense

By MAJOR W. L. CLAY, Ord. Dept.

(*Continued from page* 836)

SO FAR, we have discussed machine guns on fixed mounts so arranged that they fire through the propeller blades. Observation, attack and bombardment planes are equipped with machine guns on flexible mounts in addition to those on the fixed mount inasmuch as these planes carry observers, gunners or bombers in addition to the pilot.

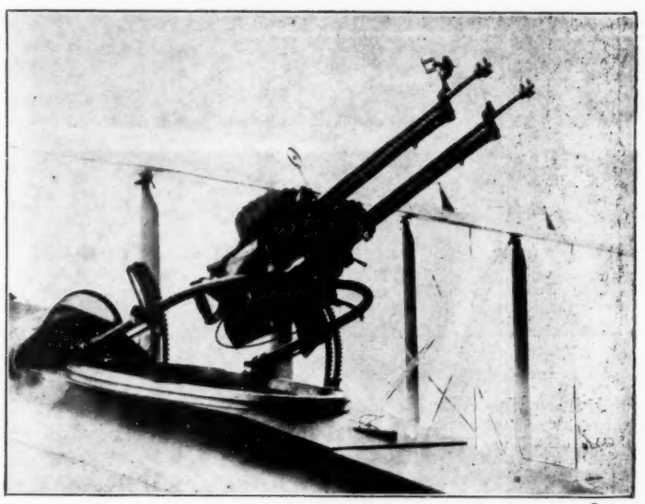
The present standard flexible aircraft machine gun is the Lewis. This gun is of the air-cooled type, magazine fed, and has a full automatic firing mechanism. It is fitted with a spade grip, a special mounting yoke, and a recoil check. These guns are installed in pairs or singly on flexible mounts. This machine gun differs from the Browning in that it is gas operated instead of recoil operated and it has a much lower rate of fire. A high rate of fire is considered desirable for the reason that in aerial combat short bursts are generally employed at frequent intervals so that the high rate of fire gives the maximum number of shots during such bursts. For this reason, experiments are being continued to adjust the Browning gun to a flexible mount to take advantage of its high rate of fire. The principal difficulty to overcome is the feeding and this has been accomplished by using a drum or box feed mounted on the Browning gun similarly to the drum magazine of the Lewis gun. The Lewis gun uses a 97 round magazine and is very positive in action as it can be fired with the airplane in any position. It cannot be synchronized and, therefore, its use as a fixed gun for firing through the propeller is barred.



Marlin and Lewis Aircraft Machine Guns
Fig. 6.

The Lewis gun weighs from 17 lb. 4 oz. to 18 lb., and fires at an average rate of 600 shots per minute. Experiments have been conducted to increase the rate of fire by adding a buffer arrangement in the spade grip and by adding a muzzle pressure device to increase the rate of recoil.

The empty shells from the Lewis gun are caught in a shell deflector bag which is clamped to the receiver of the gun. This bag is made of heavy canvas reinforced with wire and is held in a distended position by three wire loops. The bottom of the bag is closed by a flap which may be unclasped to permit the removal of the shells. The bag will hold 97 empty cases. Fig. 6 shows an airplane flexible gun mount and Fig. 7 shows two Lewis machine guns mounted. The Lewis guns generally use ring and wind vane sights mounted on the right gun. Fig 8 shows the method of using the Lewis machine gun on flexible mount.



Lewis Aircraft Machine Guns
Fig. 7.

In addition to caliber .30 and .50 machine guns for flexible use, the 11 m/m Vickers machine gun is available for this purpose. The Ordnance Department has also developed through the efforts of Mr. Browning and the Colt's Patent Fire Arms Mfg. Company a .37 m/m automatic gun for use in aircraft and it functions very satisfactorily.

Ammunition for Aircraft

The specifications for A-1, known as aircraft ammunition, require 100 per cent inspection of all rounds. In other words, this ammunition is given a much more rigid test before acceptance than any other due to the importance of avoiding malfunctions in the air. The 100 per cent inspection includes the guaging of each round and the hangfire test previously referred to in this article.

For the caliber .30 machine gun, four types of ammunition were used during the War. Modifications and combinations of these types have been produced in small quantities, while similar types have been made for the caliber .50 machine gun.

Ammunition of various types has been developed for the .37 m/m guns but as it is similar in most respects to that used by the ground guns, it will not be discussed here.

Tracer Ammunition

The need of a cartridge which, when fired would leave a trail of smoke or produce a light that could be seen in flight was apparent as soon as aerial combat started. The great speed of flying and the amount of maneuvering in aerial combat precluded the exclusive use of sights as the only method of pointing the machine guns. The range or direction of fire could not be estimated in the air as there was no background where the pilot might watch the strike of his bullets and, thereby, correct his aim. Development of such a type of ammunition was undertaken by the Ordnance Department and successful results obtained. Millions of tracer

cartridges were made during the War, the bullets of which traced from 500 to 700 yards with a distinct bright light.

The desired effect was produced by inserting a chemical composition under high pressure into the base of the bullet and this composition ignited as the bullet was started by the cartridge powder charge and produced a light that the pilot or gunner could see during its flight.

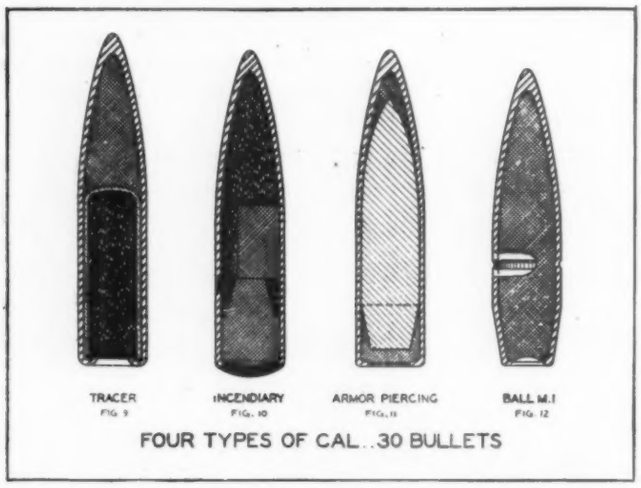


Fig. 9, 10, 11, 12.

During the War, tracers were made to give a greenish white light but experiments were also conducted which resulted in tracers of various colors including a distinct red. It was later found that red was the most satisfactory color as it does not blend with the colors in the sky and, therefore, gives a more clearly defined trace. This color has recently been adopted as standard. The new composition gives a trace of about 1200 yards. Experiments are being continued on all types of tracers in an effort to improve them wherever possible.

Tracer cartridges are loaded into the ammunition belts for machine gun use in the proportion of one tracer cartridge to four other cartridges. Every fifth bullet will, therefore, indicate the path of flight of all bullets being fired by the aircraft machine gun. There is no fixed rule as to the distribution of tracers in the machine gun belt as some fliers like more than one to four, while others prefer less.

The incendiary ammunition has a bullet filled with white phosphorus and its primary use is against observation balloons. This cartridge was not designed for combat use as it would produce rather an inhumane wound and aviators flying with magazines loaded with incendiary cartridges generally carried orders to attack the enemy's balloons so that in case of capture they would not be charged with using this ammunition for combat purposes against personnel. The bullet jacket was made in the usual pointed form and the white phosphorus pellet was then inserted. In the rear of the phosphorus were two lead plugs to balance the bullet and produce the seal at the rear. The end of the bullet jacket was then spun over and hard solder used to seal the base. A small hole was pierced through the bullet jacket opposite the tapered part of the rear lead plug. Soft solder was melted into this hole. The bullets were then given a heat test to insure that there were no leaks after which they were loaded into cartridges. See *Fig.* 10.

When the bullet was fired its friction against the machine gun barrel produced sufficient heat to melt the soft solder from the small hole and reduce the phosphorus to a molten state. As soon as the bullet issued from the barrel, the molten phosphorus was ejected from the hole in the jacket due to centrifugal force and began burning immediately on contact with the air. The bullet carried its incendiary properties from 400 to 550 yards after which the phosphorus was generally burned out. The incendiary bullet was first made with a blunt nose as it was reported that this type gave better results against balloons. This type was never in much favor with those in charge of the development as there were numerous stoppages of machine guns with this bullet. This type was afterward changed to the bullet with pointed nose.

Armor Piercing Ammunition

As armor plate came into use for the protection of personnel during combat, it became necessary to develop ammunition which would pierce the plate and destroy its effectiveness. Bullets of various designs have been used by our aerial forces but the fundamental principle of each is the same; viz., the use of a steel core inside of the bullets.

The steel core is hardened and tempered to give the proper degree of hardness to cause penetration without shattering. It should weigh at least 50 per cent of the weight of the entire bullet. The core is then inserted into the bullet jacket in rear of a conical shaped lead-alloy point and the base is sealed with a lead-alloy slug to prevent the high-pressure gas from ripping the bullet apart as it is fired. The armor piercing ammunition should readily penetrate .20 armor plate at 500 yards. These cartridges are interspersed with tracer and ball cartridges in the aerial machine gun belts. The tip of the bullet is blackened to distinguish the cartridge from other types. See *Fig.* 11.

Ball Ammunition

During the war, ball ammunition was the same as used by the ground troops except that it was manufactured and inspected more carefully, packed, and marked differently. The bullet was the standard 150 grain type with pointed nose

Fig. 8. *Lewis Guns on Flexible Mount Installed on Army DH-4.*

and flat base which was fired at a muzzle velocity of 2700 ft. per sec. This cartridge was excellent for aerial combat but was deficient for use in machine gun barrage firing. After the Armistice, great progress was made in the development of a new service cartridge having greater ranging qualities and more striking energy. The new cartridge fires a bullet of the boat-tail type weighing 172 grains at a velocity of 2700 ft. per sec. It has an effective range of 4500 yards while the old cartridge only carried about 3400 yards. See *Fig.* 12.

Many other cartridges have been developed for special purposes but will not be described here as some are of a confidential nature.

Bombs

Commercial aircraft of the larger type could readily be adapted for use as bombers provided consideration was given to methods of carrying bombs and the strengths of the various members designed to carry the load. In addition, it is highly essential that provision be made for a suitable compartment or cockpit for the bomber, as the latest designs provide for the bomb sight being attached to the floor of the plane at the extreme forward end of the longitudinal axis of the

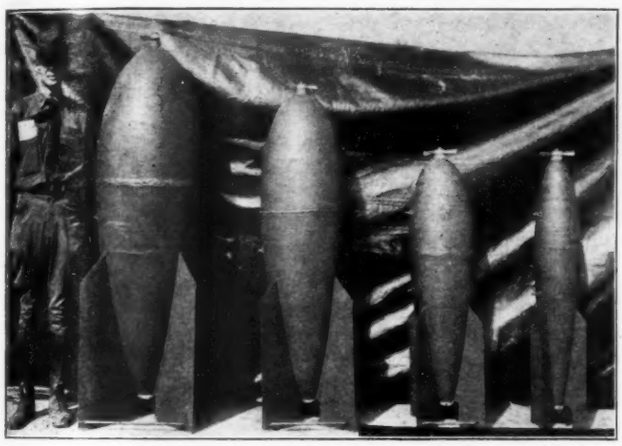


Fig. 13. *Demolition Bombs*

fuselage in such manner as to give unobstructed vision from vertically downward to horizontally forward. The importance of the location of the bomb sight and the convenience of all operations relating to sighting and the release of bombs is becoming more and more evident and should not be overlooked.

There are three types of bombs used by our Air Corps; namely, the Fragmentation, Demolition and Chemical Bombs.

The fragmentation bombs are of light weight known as the 17 lb. Mark II and the 25 lb. Mark III. These are for general use against personnel and are designed to give a great number of fragments when the bombs detonate. These bombs can be carried by racks mounted on the underside of wings of the airplane. They are generally dropped by fast flying planes which swoop down upon the troops of the enemy, dropping the bombs and then zooming out of danger.

The demolition bombs are made in various weights from 100 to 2000 lb. The principal ones in use by our Air Corps are the 100 lb., 300 lb., 600 lb., 1100 lb., and 2000 lb. Experimental bombs of greater weight have been produced but not adopted as a standard for manufacture. The demolition bomb is used primarily for bombing railway sidings, ammunition dumps, store houses and magazine areas, fortifications, etc. These bombs are loaded with high explosive and the bomb shell is generally made thin to provide for a maximum amount of explosive for a given weight. The later bombs of this type can be carried by racks attached to the wings of the airplane but as a rule they are carried by racks built into the fuselage of the plane. When loaded on the ordinary bomb rack built into the plane they can be dropped one at a time, or in pairs, or very rapidly in sequence by proper manipulation of the operating handle in the bombers cockpit. The racks are so constructed that bombs can be dropped safe in order not to explode on impact, or armed to cause detonation on impact as may be desired. The bombs are generally equipped with a nose and tail fuse to insure functioning. A view of the demolition bombs used by our Air Corps is shown by *Fig.* 13. A rack designed to carry twenty 100 lb. bombs and suitable for mounting in the fuselage of the Martin Bomber is shown in *Fig.* 14.

Chemical bombs of varied types have been developed to produce incendiary and smoke screen effect upon impact. The incendiary type had been made according to two designs, one of which scatters the incendiary mixture, while the other concentrates the incendiary material to produce an intense heat at one particular spot. Bombs loaded with smoke producing

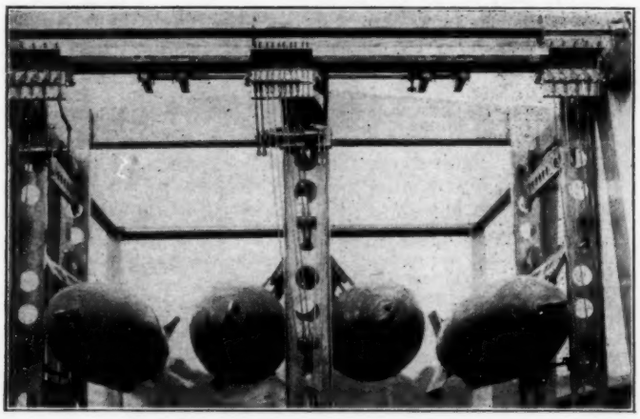


Fig. 14. *Bomb Rack for* 100 *lb. Bombs*

materials have been designed to give a screen effect to conceal movements of troops or ships. The incendiary bombs are equipped with nose and tail fuses and are carried on bomb racks similar to the fragmentation and demolition bombs.

In Conclusion

We must not lose sight of the military value of a great commercial air force. In the extension of our aerial mail service and other commercial enterprises, the adaptation of these planes to military service should be one of the considerations in their design.

Military aviation is indeed on the threshold of a new era and it is an opportune time for all to give serious consideration to the inclusion of commercial aviation in our new endeavors. Let us look into the future and not find ourselves unprepared in the latest of modern methods of warfare in case we are unfortunate enough to have another great emergency.

Prof. O. H. Basquin Joins Haskelite

Prof. O. H. Basquin, who has been consulting engineer to the Haskelite Manufacturing Corporation since its organization, has resigned from the staff at Northwestern University, with which he has been associated for twenty-five years, to take charge of the engineering department of this company.

Professor Basquin's research work in the field of strength of materials and his experiments with the fatigue-phenomena of metals fits him to meet the problem in connection with the production and application of Haskelite, the structural plywood, and plymetal. The application of plywood in the field of aircraft will be one of the important problems which he will help to solve. During the War, Professor Basquin conducted exhaustive tests on fuselage construction and he will be in a position to undertake studies of this character for the Haskelite Company whenever the opportunity offers.

Unique Aviation Record

A novel aviation record was recently made by Lieutenant Thoret, the French flier, when he carried food and other material aid to French scientists at Mont Blanc Observatory.

The noted French pilot made thirty-one successful flights to the top of Mont Blanc, which is 15,781 ft. high, between Oct. 16 and 31.

The Westbury Lightplane Club

A Practical and Active Flying Club Organizes in the East

WHILE AMERICA is probably the greatest country in the world for clubs, there is one activity which has failed as yet to gather a train of societies in its wake, and that is aviation. There have been half-hearted attempts here and there to form amateur organizations for the purpose of studying the principles of flying and the designing of airplanes, but there has been no serious and sustained attempt on the part of novices to master the art. At least that was true until six weeks ago.

Encouraged by the success of light airplane clubs in Germany, France, and England, four Waterbury young men got together, Aug. 31, and organized themselves into the Waterbury Light Plane Club. The first official meeting was held next day, and on Sept. 2, a plane was bought with money collected as initiatory fees and put in operation at the Bethany flying field, a few miles South of Waterbury. A simple history, perhaps, but significant in the light of the rapidly growing interest in aviation as a practical and commercial enterprise. As far as can be learned, the Waterbury club is the first organization of the sort in America to own and fly its own plane.

Objects of the Club

The purposes of the club as outlined in the constitution are: To promote interest in aviation, particularly as it applies to lightplanes; to promulgate the knowledge of aeronautics by securing speakers, literature, and instructors for the teaching of aerodynamics; to aid in the advancement of aviation by lending support to all branches of aeronautical activity; to foster new developments in aeronautics; to give the members practical experience in the maintenance and flying of airplanes; and to engage in lightplane activity by designing, building, and operating lightplanes.

The Waterbury club has a very extensive program, and has the advantage of owning a plane right at the beginning. But the members are starting with the fundamentals of the art of aviation, with weekly study of aerodynamics and the theory of flight. The club meets every Tuesday night and for three hours plugs diligently through the foundation studies of the art of flying. Later, it is planned to have speakers and open meetings. But at present the members are more intent on learning how to fly than on creating a sensation.

Practical Experience

Along with the study of the theory of flights, is the opportunity to learn first hand from actual experience with a plane how the theory is applied. The plane owned by the club is a JN-4, about six years old, but equipped with a new Curtiss OX-5, 90 hp. engine. The plane makes a maximum speed of about 75 m.p.h., and will carry two persons.

Since the formation of the club, the plane has been in the air almost every day. The members, among whom are two licensed pilots, go down to the flying field every night after work, Saturday afternoons, and all day Sundays. They rolled up a record of 30 flying hours in less than a month. When the plane is not in the air, it is receiving the careful and loving attention of its guardians, who aspire to be designers and builders of airplanes as well as pilots.

Plans to Build Plane

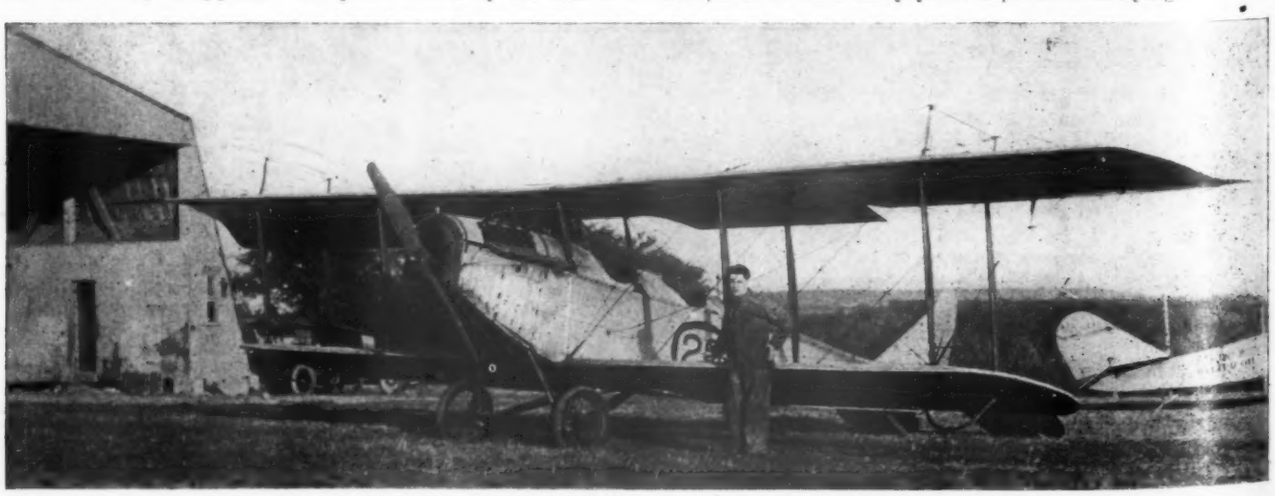
The aim of the club is to design and build a lightplane of its own after the members have learned enough about aeronautics and aircraft construction. But it is a long way from the first principles of aerodynamics to the final production of a plane that will fly, a path, however, which the Light Plane Club is following steadily and consistently. It is their hope, of course, that other clubs may be formed as in England with the chance for competition and inter-club meets.

There are four charter members of the club, the four to whom it occurred two months ago to start something that was venturesome in the extreme and held no definite promise of success. They each paid $100 as an initiatory fee, the money being used to purchase the plane, which was got as bargain through a lucky train of events. Social members, with restricted privileges are admitted on a $10 membership fee.

Orville Crooker was the moving spirit in the organization of the club and at present is the instructor in aerodynamics. He is a graduate of Worcester Polytechnic Institute and at present is with the Waterbury Iron Works as a structural engineer. Flying is a hobby with him, acquired during his school years.

Benjamin S. Kelsey is at present a student in Massachusetts Institute of Technology, and has flown for the last seven years, since he was 14 years old. He attended the Curtiss school of flying on Long Island for two years and has done much exhibition work. He obtained a pilot's license three years ago and is the club flying instructor.

B. Irving Jones is a member of the 43rd division of the Connecticut National Guard, and is learning to fly. Ralph W. Barker has had no experience. Gus Graff joined later as a full member and is at present helping with instruction. He is known in the Waterbury section as the air wizard. He has done parachute jumping from balloons and airplanes both, and has had many years experience in flying.



The Jenny belonging to the Westbury Lightplane Club

THE

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LARGEST PRODUCERS OF COMMERCIAL AIRCRAFT IN AMERICA ANNOUNCE

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WACO-9

THREE-SEATER

$2250.

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More WACO'S are now in service for profit and pleasure than all other planes now in production in America.

THE PERFORMANCE MADE THE DEMAND

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THE ADVANCE AIRCRAFT COMPANY

TROY, OHIO

The Pitcairn Orowing

A Three-Seater Sport Plane With OX-5 Engine

THE OROWING was designed as a low-priced sport plane which could also be used for passenger carrying and for primary instruction to supersede the ubiquitous Jennie. The control stick and rudder bar in the front cockpit with their connections are readily removable, very quickly converting the plane from a training plane to a passenger carrier. The original conception was to build a steel tube fuselage for the Curtiss Oriole and this has been kept in mind throughout the design.

Fuselage

The fuselage, like that of its predecessor, the Fleetwing, is of trapezoidal section, the larger of the two parallel sides being at the top, and is welded up of 1025 steel tubing. The Pratt type of trussing is used for the upper and lower longerons, and the Warren type to connect the two. The engine mount is welded integral with the fuselage, and the engine bearers are of spruce and ash to insulate the fuselage from engine vibration. The fuselage tapers at the rear to a vertical V, to which the fin beam is bolted. To the lower end of this V, a short stud skid is fastened to protect the rudder in case of breakage of the tail skid.

The landing gear is of the V-type with thru-axle and is of orthodox construction. The vees are made of 1025 streamline steel tubing, and follow the design of the Oriole vee. Cast bronze blocks are used to bolt the vees to the fuselage. The wheels are 26 x 4 and are faired with aluminum spinnings.

The tail skid is made of round steel tubing and is hung on a swivel mount. The shock absorber is wound on two cast aluminum spools which are readily removable by taking out a single bolt, which also takes the check wires. The tail skid is removable upon withdrawing the pivot bolt, and the entire tail skid mount can be taken out by removing two additional bolts. The shoe is a manganese bronze casting to insure long wear.

Wing Cellule

Almost the entire wing cellule of the Oriole is used on the Orowing, the exceptions being the cabane struts and the wing skids. The cabane struts are of streamline steel tubing, and the interplane struts will be of that material when the present supply of wood struts is exhausted. The wing skids are omitted entirely, being deemed unnecessary. The cut-out in the upper wing at the center has been filled in, adding about seven sq. ft. to the area, and the gas tank has been taken out of the center panel. Hard cable is used throughout for wing bracing, the flying wires being double and the landing, single. The wings are set at 2½° incidence and 1½° dihedral, with a stagger of 14¾ in. and a gap of 64⅞ in.

The Oriole controls are modified somewhat for the Orowing. The stick control unit is practically the same, the torque tube and the front stick being shortened. The cable from the control sector on the torque tube instead of running along the nose of the lower wing to a horn on the lower aileron, is led along the top surface of the lower wing just aft of the span, around a pulley at the front outer strut point, and up to a jawbolt on the under side of the upper aileron. A strut connects the upper and lower ailerons.

Tail

The tail surfaces of the Oriole are used on the Orowing, slight modifications being made in the attaching parts. The fin is adjustable to balance the effect of engine torque, but the stabilizer is fixed.

The power plant is a Curtiss OX-5 engine delivering 90 hp. at 1400 r.p.m. Gasoline is fed to the carburetor from a 30 gal. gravity tank located in the first bay of the fuselage. A honeycomb radiator is mounted on top of the fuselage cowling just aft of the engine and extends nearly to the upper wing. The instrument leads, ignition wires, and gasoline shut-off rod are led forward from the pilot's cockpit outside the fuselage struts and inside the fabric cowling, where they are less liable to damage from the passengers' movements in and out of the plane.

Accommodation

There is a roomy passenger cockpit just aft of the gas tank and under the center panel and a pilot's cockpit immediately behind. The edges of both cockpit openings are upholstered, and plywood floors are installed in both cockpits. Seat and back cushions are fitted to both seats. Windshields are of celluloid and completely protect the passengers and pilot from

The Pitcairn Orowing three-seater (Curtiss OX-5, 90 hp.)

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Quality is first in their design and manufacture
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Only American manufacturers specializing in training airplanes
Five years continuous development on one basic design
Safest training and sportsmen's airplanes ever flown

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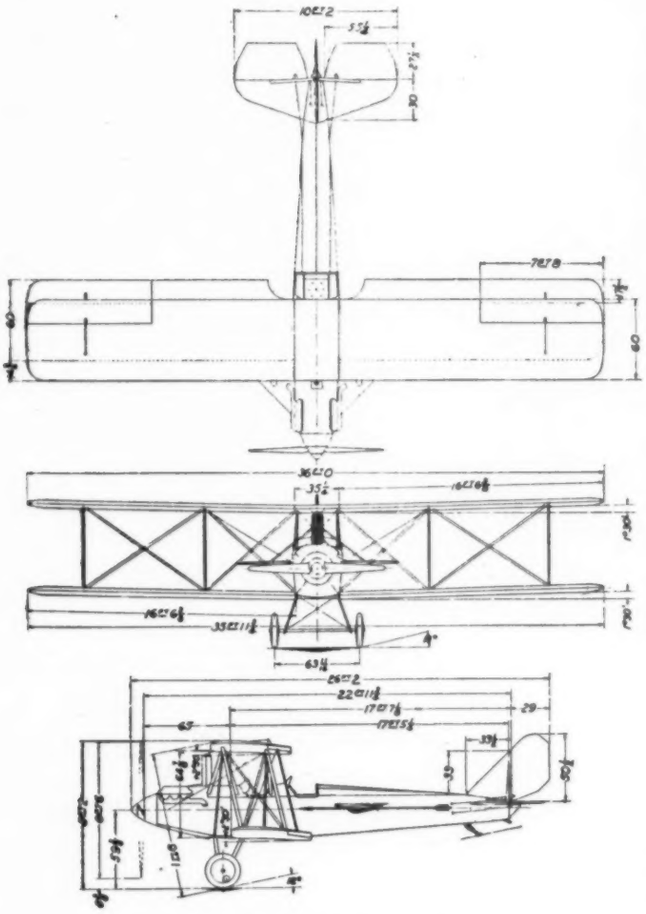
CONSOLIDATED AIRCRAFT CORPORATION

Buffalo, New York

the slipstream. The following instruments are installed in the pilot's cockpit: tachometer, engine switch, oil pressure gauge, water thermometer, and altimeter. The plane is fabric covered, and a color scheme of black and yellow has been carried out. The fuselage, wing struts, landing gear, and all



General layout drawings of the Pitcairn Orowing

exposed wires and fittings are doped or painted black, and the wings and tail surfaces doped yellow. The fabric surfaces are finished with two coats of clear dope, brushed on, and two coats of clear and two of pigmented dope, sprayed on.

General Characteristics

Span, upper wing	36 ft.
Span, lower wing	35 ft. 11⅝ in.
Chord, both wings	60
Gap	64⅞
Stagger	14¾
Incidence, both wings	2½°
Dihedral, both wings	1½°
Length overall	26 ft. 2
Height overall	9 ft. 2½
Weight empty	1345 lb.
Useful load	755 lb.
Passenger	340
Pilot	170
Gasoline	180
Oil	32
Water	33
Weight loaded	2100 lb.
Area of wings	338.37 sq. ft.
Area of horizontal tail	33.00 sq. ft.
Area of vertical tail	13.00 sq. ft.
Power	90 hp. at 1400 r.p.m.
Wing loading	6.2 lb./sq. ft.
Power loading	23.35 lb./hp.
Wing section	R.A.F. 15 modified

Performance

Maximum speed	90 m.p.h.
Cruising speed	80 m.p.h.
Minimum speed	45 m.p.h.
Service ceiling	10,500 ft.
Cruising range	400 mi.
Endurance at cruising speed	4 hr.

The Cleveland-Louisville Air Mail Contract

Postmaster General New announced on Nov. 8 that he had awarded the contract for carrying the mails by air from Cleveland, Ohio, to Louisville, Kentucky to the Kaess Aircraft Engineering Corporation of Amityville, Long Island, N. Y. The concern will receive $2.20 a pound for the service and will be entitled to carry passengers and freight as well as mail matter.

The distance between the two cities is 339 miles each way and, in addition to the cities named, the route will serve Akron, Columbus, Dayton and Cincinnati, Ohio.

The company will use twin-engine planes of its own construction, the first time that this type of airplane has been employed on a commercial air route in this country. The planes will be capable of a speed of 135 m.p.h. The service will connect with the overnight New York to Chicago air mail service and will be performed entirely at night. A supplemental day service is also contemplated by the successful bidder.

Robertson School of Aviation

The Robertson School of Aviation, of Anglum, Mo., was organized April 25, 1919, and is one of the oldest flying schools in this country. Major Wm. B. Robertson and Lieut. Frank H. Robertson, its founders, are both graduates of Army training schools and the instructors are air mail pilots with wide experience and training.

The training equipment used is of the very first class, the planes consisting of Standard J-I's, De Havilands, with 400 hp. Liberty engines, and C-6 and Hisso engined Orioles. Seventy-six students were graduated from the school in 1925. Individual attention is given to each student and he is soloed regardless of the number of hours of instruction required. The school is an educational institution as well as vocational and is open the entire year.

The Air Mail Pilots of America

The Air Mail Pilots of America is an Association of pilots in the Trans-Continental Air Mail Service. The Association, which has been in existence since November, 1920, has, almost since its inception, had practically one hundred per cent membership.

It was formed primarily to enable pilots to keep in touch with each other and help them, through co-operation, to solve their problems. One of the methods adopted was the issuing by the Association of news letters. There are forty-five members, scattered from coast to coast. The majority of the members have been in the Air Mail Service for more than five years. The total years flown by the pilots in the Trans-Continental Air Mail Service exceeds 200.

Air Service Between Australian Capitals

Proposals for the establishment by a private company of an air mail and passenger service between Perth and the capitals of the Eastern States of Australia have been made and are now under consideration.

The proposal provides for the establishment of a weekly service at a speed of 90 m.p.h. flying by day and night. The service would leave Perth at 9 o'clock on Tuesday mornings and arrive at Adelaide at 2 o'clock on Wednesdays, and Melbourne six hours later.

Although it is proposed that private enterprise should carry out the service, a minimum of 25,000 letters each way each trip would have to be guaranteed to make the service pay, it is said. A surcharge of three pennies per half-ounce letter on this number, in addition to the revenue from passengers, would be considered a sufficient inducement, if the requisite mail were guaranteed, for the introduction of the service. The delivery of mails by the air service would reduce by four days the delivery of oversea mails at Melbourne by way of Fremantle.

A PREDICTION REALIZED

The New Curtiss "FALCON"

DURING the past several months, the first group of Curtiss "Falcons" to be delivered to the Army have been undergoing service tests in the hands of Air Corps pilots. As was foreshadowed when the "Falcon" won first prize in the Observation Competition at McCook Field, this new observation airplane has rapidly gained favor with the flying personnel, who have found it much faster and more maneuverable than the present service type.

Powered with either the Curtiss D-12 or the Liberty motor; excellent from a maintenance standpoint; with a truly remarkable performance, the "Falcon" fulfills its advance indications of being the finest observation type in service today - a worthy "big brother" to the Curtiss "Hawk", the standard service pursuit plane of the U. S. Services.

FIRST - SECOND - FOURTH - FIFTH - *in the Liberty Engine Builders' Race for observation airplanes at the Philadelphia National Air Races.*

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American Soc. for Promotion of Aviation

By THOMAS L. HILL, President

IF THERE had never been a great war and a Royal Flying Corps of Canada, it is very probable that The American Society for Promotion of Aviation would not be in existence today. In 1917, one hundred men, selected mainly from the colleges throughout the country, were assembled at Governors Island, New York, and sent to Canada, attached to the Royal Flying Corps for training. Arriving in Canada they found hundreds of other Americans, "camouflaged yanks," wearing the R.F.C. uniform. Groups of American cadets, finishing their ground school work at American colleges, were also sent for training, and the body, thus assembled, moved through Canada, Texas, England and on to France. The friendships there formed are the sort that only the grim reaper will terminate. After the War, through the effort of a number who had trained with this group, a yearly banquet was held to which many of the old gang returned for an evening to renew the old friendships and do a bit of "barracks flying." It was from these yearly gatherings that the thought and spirit of the A.S.P.A. originated.

In February, 1925, the A.S.P.A. was organized with the stated purpose of "arousing and maintaining interest in aviation, as our strongest arm of National Defense." It was planned to accomplish this work through the method of educational propaganda, knowing that when the general public was more conversant with the problems of aviation and its possibilities, the support necessary for its development would be accorded.

Organized Many Talks

Conforming to this policy, the A.S.P.A. arranged over eighty talks upon the subject of aviation before clubs, societies and from radio stations in all parts of the country, during the year 1925. We have co-operated with the press in securing articles relative to aeronautics, and have been able to advise them upon many occasions. We have supported the idea of co-ordinating the country's air activities. We have co-operated with individuals and communities in the laying out of landing fields. In conjunction with this work we circularized over fifteen hundred mayors of towns and cities throughout the United States, encouraging them to work for a landing field in their community. The replies received indicate that the seed fell upon fertile soil.

Early this year, the writer accompanied Farnam Parker, fourteen years of age, and the World's youngest licensed pilot, to Washington. The boy was presented to President Coolidge and to the House of Representatives then in session. The publicity created, resulted in the public learning that aviation could be made a sport in which boys of an early age could participate. Plans for an educational flight through the South and West, under command of Capt. Roscoe Turner, were arranged by members of this Society. Though plans were somewhat changed, Captain Turner and Lieutenant Graff, members of the A.S.P.A., not only made the flight, but, by flying eight salesmen from St. Louis to the territories in the East, achieved publicity that reacted very favorably to the advancement of aviation. The flight was continued through New England. On one occasion thirteen passengers were carried. The Sikorsky S-29 was used on this trip.

Instruction Plans

During 1926, opportunities have arisen, or have been created, which enabled members to appear before school assemblies and boys clubs, giving talks on aviation. The response shown denotes a remarkable interest. An extensive report covering a plan for the teaching of aeronautics in the New York schools has been prepared by members of the A.S.P.A. and submitted to interests who regard it favorably. One thousand dollars has been donated as a prize for the first boy or girl, under eighteen years of age, who flies from San Francisco to Boston, under rules of competition arranged by this Society. Rules and regulations will be so arranged that every possible element of danger will be removed. The spectacle of a dozen young pilots making the flight will create national publicity which cannot help but attract the attention of the youth of America to aviation as a sport. Additional prize money has been promised and it is likely that before the flight takes place, other offers will be made. The flight is scheduled for September, 1927.

Membership

Our membership covers a wide field. Members who have given their time to promote the work are too numerous to mention. Col. Harold E. Hartney, Capt. Arthur R. Brooks, Capt. Homer Berry, Capt. Glenn M. Pike, Lieut. R. Noble Estey and Lieut. Robert S. Bowen, by their talks over the radio, have done much to further the work of spreading aeronautical knowledge. One of our efforts tending toward the education of the younger generation in things aeronautical, was the arranging of a correspondence course in aviation. This is an arrangement of the fundamental facts, told in a simple understandable manner. The idea behind this course is to get material into the hands of the boys that will whet their interest so that they will seek further knowledge. The course is not only adaptable for boys and boys clubs, but many persons who have had no previous contact with aviation have taken the course and have written of the value they received.

The plan of organization is for a National headquarters, State Squadrons and local flights. The work has been all voluntary. The office space and telephone service has been the contribution of one of our members. Secretarial service has been extended gratis on many occasions. We have a membership charge of one dollar that goes to cover the cost of the silver wings worn by our members and for stationary, mailing and the other incidentals of the work.

Alexander Increases Factory Space

The Alexander Aircraft Company, of Denver, Colo., is increasing its floor space by an additional 7,800 sq. ft. The company has in course of construction another steel and concrete unit for the manufacture of Alexander Eaglerocks.

Dr. George L. Bennett of Kansas City, Mo., has been added to the rapidly growing list of Eaglerock dealers. Dr. Bennett will represent the company in Western Missouri and Eastern Kansas.

French Airmen Make Record Flight

A new long distance non-stop flight record was made on Oct. 29, when the French airmen, Coste and Rignot, landed at Djask in Persia. Starting from the Le Bourget airdrome, the fliers made the flight, a distance of 3,415 m., in 32 hr.

A Breguet bi-plane, equipped with a 500 hp. motor was used, and the route was via Strasburg, Vienna, Constantinople, Aleppo and Bassorah.

Captain Weiser and Lieutenant Challes, of the French Army, in Sept. flew from Le Bourget to Bender Abbas in 27 hr., a distance of 3,750 mi., or the same distance between Brest and New York.

Godfrey L. Cabot Vice-President F.A.I.

The Washington office has been advised by cable of the appointment of Godfrey L. Cabot, former President of the National Aeronautic Association, as Vice-President of the Federation Aeronautique Internationale. The F.A.I. is the international sporting governing body for aeronautics and comprises the affiliation of twenty-six national aero clubs.

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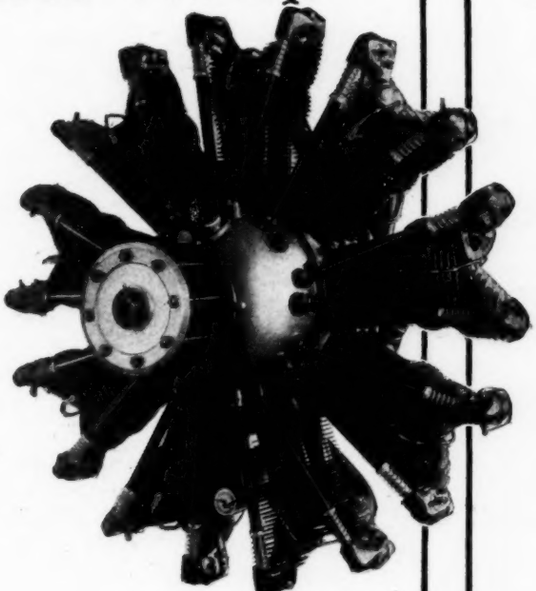
Into every engine is built the qualities which make for the fine performance and dependability so vital in both military and commercial flying.



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Side Slips

By ROBERT R. OSBORN

The news that one of the prominent express companies will shortly establish an air express service, in conjunction with its railroad and truck services, certainly must have brought joy to the hearts of veteran baggage smashers. Heretofore the baggage man's effectiveness has been limited by the height of the railroad cars and trucks from the station platforms, a drop of about six feet was about the best he could do for a trunk or box. With the advent of the airplane into this business the possibilities will be almost unlimited and he will be able to select any altitude he wishes, according to apparent strength of the article to be delivered. We can imagine the gleam in the eye of the veteran baggage master when he shoves our ancient trunk, bound with the inevitable clothes-line, over the side from about a thousand feet.

* * *

Possibly it was in anticipation of this new express service that the manufacturers of numerous articles, fountain pens and egg crates among them, have been conducting their well-advertised series of experiments in dropping them from airplanes.

* * *

The aviation enthusiasts who have been worried that interest in air races seems to be dropping off, may be reassured, for the Coast Guard is putting three Amphibian planes into service for scouting over the bootlegger fleets engaged in smuggling liquor into unguarded harbors. When the rum-runners were using high speed motor boats for their operations, and the government started building speed boats capable of catching them, there were staged some of the finest impromptu races in motor-boating history. The prizes at stake were not any mere gold cups either, as sometimes the winner obtained permanent possession of not only the boat and cargo, but the crew also. The rumor which persisted for so long that the rum-runner was using seaplanes in making his deliveries, seems to have some basis in fact, now that the government is putting seaplanes on his trail. We predict a much increased interest in high speed planes on the part of some prominent "real estate agents" and "tea and coffee merchants" in the very near future. We also suggest that the authorities investigate thoroughly anyone offering to buy the winning plane in the Schneider Cup Race.

* * *

You may remember that your attention was called to the competition between the State of California and Winsted, Conn., in furnishing the newspapers with fearful and wonderful news items. California was specializing in aeronautical feats in an attempt to steal some of Winsted's publicity for its barking cats and tree-climbing cows. At the time we mentioned it California was one point ahead, having staged a rally with a tennis game on the top wing of a plane in flight, and then repairing the loss of a wheel from a landing gear by having a young lady climb into another plane to go down after the spare wheel. It may interest you to know that Winsted tied the score with a farmer whose ground was so hard and rocky that he had to broadcast grass and grain seeds with a shot-gun. California came right back, however, and is now one point ahead. According to the news item a woman parachute jumper at Santa Monica had her 'chute foul in the landing gear of the plane from which she was jumping. "After she dangled in the air for two minutes an occupant of a second machine cut the cord. Her 'chute opened and she landed safely two miles away."

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AIRPORTS AND AIRWAYS

Buffalo, N. Y.

With the Buffalo Airport in the course of development and the commercial possibilities of aviation becoming more apparent to local citizens, the feasibility of air transportation facilities has been decided by James H. Rand, jr., president of Rand Kardex Bureau, with the result that an airplane has been put in commercial service between the chief Kardex branches and the main office.

A Buhl-Verville Airster of the Kardex Co.

Ralph Taber, of the Rand Kardex engineering department, who is to be the official pilot of the plane, piloted it from Detroit to Buffalo. The Kardex plane was made by the Buhl-Verville Company of Detroit, is powered by a Curtiss engine and is of the light express and passenger type, having an all metal fuselage and framework, with folding wings.

The trip from Detroit to Buffalo was made in 2 hr., 40 min. In the first commercial flight, the plane delivered a kardex cabinet to a Cleveland, Ohio, bank, making delivery in 3 hr.

Pittsburgh, Pa.

By Ray A. Tucker

The Aero Club of Pittsburgh recently held in its Club House at Rodgers Field, a well attended farewell party in honor of Lieut. Royal B. Lea, U.S. Army Air Corps, Air Officer of the 99th Division, U.S. Army Reserves and Commanding Officer of Air Corps Reserve Fying at Rodgers Field, the Pittsburgh Municipal Airport. It also served as an occasion for the Club to welcome Lieutenant Lea's successor, Capt. Thomas S. Voss, U.S. Army Air Corps, who has been transferred to Pittsburgh, following a three year tour of duty in the Panama Canal Zone. Lieutenant Lea is to report for duty at the Advanced Flying School at Kelly Field. Bob Dake, after expressing generous words of praise, presented Lieutenant Lea with a wristwatch on behalf of the Reserve Officers.

Ray Marlier, president of the club, then followed, with additional remarks as to Lieutenant Lea's character, ability, and popularity and the club's regret that he was leaving Pittsburgh, but wishing him success and happiness in his new assignment. Marlier, on behalf of the club then presented Lieutenant Lea with an engraved silver steak set and platter, a gift which Mrs. Lea could equally enjoy.

The secretary then read and presented Lieutenant Lea with a resolution from the club which was beautifully hand-printed

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on sheep's skin, and bore the club's seal. The resolution commended him for the faithful and energetic manner in which he had discharged his duties as air officer of the 99th Division and Commanding Officer of Rodgers Field. By the resolution, he was also elected an honorary life member of the Aero Club of Pittsburgh, and the thanks of the club were extended to him for all that he had so generously done to further its interests.

Lieutenant Lea was surprised and made agreeably happy to be the recipient of these gifts and expressions of friendship from his friends. Following each presentation he expressed his thanks and delight in being so honored, and his regrets in leaving Pittsburgh, which held so many memories and friendships.

Major Z. L. Henry, Capt. Voss and Bob Hancock followed with expressions of tribute to Lieutenant Lea. (It is reported that Bob Hancock spent a week writing his speech, but he only took five minutes to read it. It was a masterpiece, as it contained not a single cuss-word, all of which speaks well for Lea.)

On Nov. 4, the Aero Club had the pleasure of entertaining and hearing Commander Byrd at its regular weekly luncheon in the Chamber of Commerce dining rooms. During the morning Commander Byrd was accorded a reception by the Mayor and county commissioners. He was pleased with the new polished-aluminum winged auto radiator insignias which the club has just adopted for use by the members and complimented the officers on this method of advertising the Club and its promotion of local aeronautics.

Col. Harry C. Fry, Jr. has just purchased a neat plane known as a Dayton-Wright "Chummy" with an OX 5 Motor. It is to be used for his own personal pleasure and he is keeping it at Rodgers Field.

Boston, Mass.

By Daniel Rochford

Major Charles M. Wooley, of the Massachusetts National Guard Air Service, urged before the November meeting of the Boston Chapter, N.A.A., that the present Boston Airport land be purchased by the city of Boston from the state, and developed as a municipal enterprise. He declared the present control inimical to the proper development of the airport, due to the fact that the real party at interest, the city, can not legally spend money on land owned by the state. The state will not appropriate money. And there she blows!

An enthusiastic dinner gathering of over fifty men marked the eighth annual Armistice night supper of the Archie Club of Boston at the Harvard Club. The Archie Club has only the one meeting each year and limits its membership strictly to men who flew over the lines during the World War. Gardiner H. Fiske is chairman of the committee, Charles R. Codman, treasurer, and Paul F. Ives, secretary.

The Boston Municipal Air Board will meet at Young's Hotel November 23rd to consider the question of lighting the Boston Airport for night flying.

Flying in Boston the past week totaled 26 hr. for the Army, 14 hr. for the Navy, 21 hr. for the National Guard and 14 hr. for commercial pilots.

U. S. Air Forces

Assistant Secretary on Tour of Inspection

Assistant Secretary of War for Aviation F. Trubee Davison, who left Washington Nov. 5 for a tour of inspection, attended the ceremonies held Nov. 6 at New Orleans for the dedication of the New Orleans Airport. Secretary Davison was a speaker at the banquet held in the evening at the Roosevelt Hotel and left the next morning for San Antonio, where he remained until Nov. 18, inspecting the Air Corps activities at Kelly Field, Brooks Field and Fort Sam Houston. His itinerary

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also included the inspection of Fort Crockett, Galveston. Secretary Davison returned to Washington Nov. 21.

Army Air Mechanics Examination Instructions

Instructions to govern the examination and classification of enlisted men as air mechanics have been issued by the War Department, to the effect that no enlisted men will be rated as air mechanics until funds are available for the purpose.

Examinations for the rating of air mechanic, first class, and air mechanic, second class, will be held at such times and places as the exigencies of the service require. Examinations will be limited to enlisted personnel of the Air Corps, who make application in writing to, and are recommended by, their respective organization commanders. The examinations will be conducted by boards composed of officers of experience in the Air Corps each board to consist preferably of three officers except when it is manifestly impracticable to secure that number. Examining boards will be convened by commanding officers of Air Corps stations, commanding officers of Air Corps units larger than a squadron, or by the commanding officers of Air Corps troops at other than Air Corps stations.

Ratings will be granted only to enlisted men who have demonstrated their fitness and have shown that they possess the necessary technical qualifications therefor, and are engaged upon the duties pertaining thereto. When an enlisted man holding a rating as air mechanic reenlists on the day following the date of his discharge, his rating will be continued in force.

The rating of air mechanic, first class, will be given only to those men who have completed three years' service in the Air Corps except those who have successfully completed a prescribed course at an Air Corps special service school and those who have served as commissioned officers of the Air Corps of the Army of the United States.

The rating of air mechanic, second class, will be given only to those men who have completed two years' service in the Air Corps or those specially excepted.

Examinations for air mechanic ratings will be both theoretical and practical. The theoretical examination will consist of such questions as are considered necessary to show that the candidate's practical knowledge is based on correct theoretical information. The Chief of the Air Corps will, from time to time, prescribe the scope of these examinations.

Airplane Short Wave Radio Sets

An important activity of the Radio section of the Signal Corps of the Army has been the development of radio equipment, both transmitting and receiving, for use in Army airplanes. Were the space in planes not so limited, there are dozens of commercial sets which would fill all requirements. However, lack of space and the necessity for minimum weight, combined with the constantly increasing distances which airplanes fly from their home station, have made the problem difficult.

The recent discovery of the possibilities of short-wave transmission and reception has opened an avenue of progress on this problem. However, while the short-wave sets have shown some remarkable results in permanent ground stations, their adaptation to airplane use is still not entirely satisfactory. The short-wave sets meet the requirements as to space and weight, but the performance of the short waves is sometimes extremely freakish.

Certain wave lengths are ineffective for certain distances. Again, wave lengths found suitable for certain distances at one season were found entirely unsuitable for the same distance at another. There is also the phenomenon known to radio men as the "skip distance" effect. Although the Signal Corps has gathered sufficient data for a working basis of short-wave airplane sets, future experiments undoubtedly will disclose many interesting discoveries.

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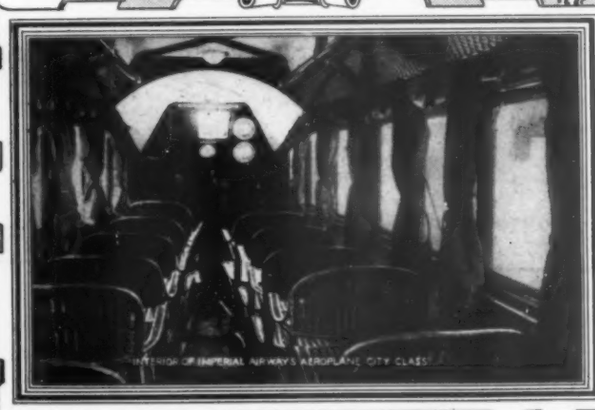

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Air Corps National Guard Units

Owing to the interest that is felt in National Guard activities, it has been decided to publish a list of the units in existence:

101 Obs. Sqdn.	Mass.	Boston Airport
101 Photo Section	Mass.	Boston Airport
118 Obs. Sqdn.	Conn.	Brainerd Field, Hartford
118 Photo Section	Conn.	Brainerd Field, Hartford
102 Obs. Sqdn.	N. Y.	Miller Field, Staten Island
102 Photo Section	N. Y.	Miller Field, Staten Island
104 Obs. Sqdn.	Md.	Logan Field, Baltimore
104 Photo Section	Md.	Logan Field, Baltimore
105 Obs. Sqdn.	Tenn.	Blackwood Field, Nashville
105 Photo Section	Tenn.	Blackwood Field, Nashville
106 Obs. Sqdn.	Ala.	Roberts Field, Birmingham
106 Photo Section	Ala.	Roberts Field, Birmingham
113 Obs. Sqdn.	Indiana	Fagley Field, Indianapolis
113 Photo Section	Indiana	Fagley Field, Indianapolis
109 Obs. Sqdn.	Minn.	Speedway Field, St. Paul
109 Photo Section	Minn.	Speedway Field, St. Paul
110 Obs. Sqdn.	Mo.	Anglum Field, St. Louis
110 Photo Section	Mo.	Anglum Field, St. Louis
120 Obs. Sqdn.	Colo.	Lowry Field, Denver
120 Photo Section	Colo.	Lowry Field, Denver
111 Obs. Sqdn.	Texas	Ellington Field, Houston
111 Photo Section	Texas	Ellington Field, Houston
116 Obs. Sqdn.	Wash.	Spokane Airport
115 Obs. Sqdn.	Calif.	Clover Field, Santa Monica
115 Photo Section	Calif.	Clover Field, Santa Monica

The following units have been organized but have not yet received equipment:

103 Obs. Sqdn.	Penn.	Philadelphia Airport
107 Obs. Sqdn.	Mich.	
154 Obs. Sqdn.	Ark.	Little Rock

The following unit has been organized, but has not yet been formed:

112 Obs. Sqdn.	Ohio	Norton Field, Columbus

Inspect Airplanes

Rear Admiral William A. Moffett, Chief of the Bureau of Naval Aeronautics, Maj. Gen. Mason M. Patrick, Chief of the Army Air Service and Orville Wright left Washington Nov. 8 on a tour of inspection which included the aircraft factory at Philadelphia, Langley Field, Va., and Norfolk, Va. The committee inspected the PN-10 planes under construction at the Philadelphia factory, as well as the latest inventions in aircraft at the various places on their itinerary. While at Norfolk they witnessed the Schneider Cup Races.

Army Air Orders

Lieut. Comdr. Alva D. Bernhard det. com. USS Litchfield, to temp. duty N.A.S., Pensacola.

Lieut. (jg) Stanley Leith to N.A.S., Pensacola, orders Sept. 6 modified.

Lieut. Comdr. Francis M. Maile det. com. V. O., Sqd. 1, Aircf. Sqdns., Battle Fleet, to command V. O., Sqd. 2, Aircf. Sqdns., Battle Fleet.

Lieut. Joseph W. Baker det. Nav. Trng. Sta., N.O.B., Hampton Roads, to N.A.S., N.O.B., Hampton Roads.

Lieut. Benjamin R. Holcombe det. Bu. Aero., to USS Robert Smith.

Lieut. Comdr Wallace L. Lind det. USS Arizona, to temp. duty N.A.S., Pensacola.

Lieut. Byron J. Connel det. Bu. Aero., to duty with Sctg. Sqd. 2 (VS-2), Aircf. Sqdns., Battle Flt.

Lieut. Lawrence W. Curtin det. c.f.o., PN-10 planes, to duty with Sqd. 2 (VS-2), Aircf. Sqdns., Battle Fleet.

Lieut. Herbert C. Rodd det. Bu. Eng., to duty with Sctg. Sqd. 2 (VS-2), Aircf. Sqdns., Battle Flt.

Lieut. Clarence H. Schildhauer det. N.A.F., Navy Yard, Philadelphia, to Sctg. Sqd. 2 (VS-2), Aircf. Sqdns., Battle Flt.

Lieut. Walter W. Gilmore det. USS Camden, to N.A.S., Pensacola.

Lieut. Leslie E. Gehres det. 11th Nav. Dist., San Diego, Cal., to temp duty N.A.S., Pensacola.

Lieut. Robert P. Cunningham det. Nav. Air Sta., Pensacola, to Navy Yard, Philadelphia.

Lieut. Comdr. Hugh L. White det. Nav. Yard, Philadelphia, to temp. duty Nav. Air Sta., Pensacola.

Lieut. (jg) Edward Curtis det. Nav. Air Sta., Pensacola, to USS Marblehead.

Marine Air Orders

Pay Clerk J. J. Reidy det. M.B., N.A.S., Lakehurst, to Chicago, Ill. for duty as deputy A.P.M., Phila.

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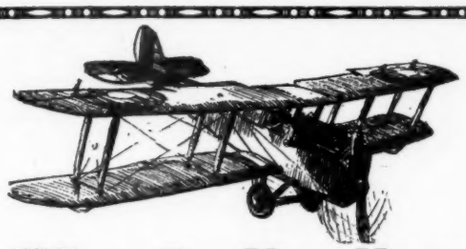

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PUBLISHER'S NEWS LETTER

When a complaint is received by a publisher or there is criticism of any policy advocated by the publication it should receive the most courteous attention. This page has often been used to reply to critics. Usually, their names are not given and their comments are treated as typical of those that may be in the minds of other readers. We have even been called to account by those who have written for not printing their names, as they feared that they might be thought to have made an anonymous comment. For the first time in several years a letter of this kind has been received that will be replied to, not because it is a personal criticism but on account of the opportunity it presents to clear away any misapprehension as to the stand this paper has taken on the subject of aircraft regulation.

* * * *

The writer of the letter who is evidently a very careful reader of AVIATION quotes an address made in London before the Society of British Aircraft Constructors during which the publisher of AVIATION said that British aircraft could be used with confidence because they were built "under the rigid inspection of the Air Ministry". He then quotes a statement made in September on this page that "AVIATION has always believed in the most simplified and lenient form of regulation, while aeronautics is in a formative state. The experience of England with drastic regulatory measures has produced a deplorable condition. This country will do well to learn from the experience of others rather than from any action that may tend to set back air development when hopes are so bright."

* * * *

First, let the statement made in London be considered. There, the Air Ministry regulates not only aircraft, airdromes and the airport facilities but the pilots and the mechanics as well. But they also provide the subsidies that make the British air lines possible which makes the situation very different from that in the United States. If the one that pays makes demands that appear severe and costly, it is only a matter that concerns the same agency. The question of cost of operation does not have to be considered from a commercial standpoint. It is not too much to say that many of the air lines of Europe might be operated without a subsidy if the drastic regulations that they operate under were less strict. The British air regulations have been so extremely severe that the cost of aircraft as well as their operation has been greatly increased. They have almost wiped out what we term aerial service. The great development of light airplane clubs which has been so encouraging has been fostered by generous grants by the Air Ministry. The schools for the flying instruction have been largely supported by the government. It will therefore be evident that the conditions that exist in England can hardly be applied to those in the United States. And it is a very true statement that a sense of great security is felt by all who travel on the English aircraft because the supervision of their construction has been very strict.

* * * *

Now turn to the situation in this country. So far as our memory goes there has never been in these columns any advocacy of lenient supervision of aircraft that are to carry passengers. We have felt that the manufacturers of transport planes were to be relied upon, if only for selfish business reasons, to make their planes as safe as possible. We hope and believe that the regulations for aeronautics in this country will be such that it will not be necessary to make the price that has to be charged for aircraft for commercial purposes so high that they cannot be operated with a profit. If the government were subsidizing commercial aviation, then it would demand that the strictest kind of regulations be promulgated.

* * * *

But grant, for the sake of the next point, that no government inspection or operation regulation can be too strict for the passenger carrying planes. Consider what would happen to those companies that are operating aerial service enterprises if the same requirements were made applicable to both. If the standard demanded by the Government were as strict as it is abroad, the cost of commercial planes for aerial service would increase to a point where they would become unprofitable to operate. In addition to this, if the qualification of pilots and the examination of all mechanics became severe, the expense would become so prohibitive that this promising branch of our development would be almost exterminated. The one great difference between the aerial development in this country and Europe is that here aerial service has spread to hundreds of cities, whereas abroad it is only seen to a very limited extent.

* * * *

We hope that we have explained what may have appeared to be an inconsistency. If those who favor strict regulation would talk to manufacturers and operators abroad,—those who have felt the hardship of the minute detailed supervision,—they would soon reach the conclusion that the less regulation the better while the art is in an experimental stage. We are glad to observe that the manufacturers and operators were practically unanimous in asking that the Bureau of Commerce regulations be made simple and general rather than detailed and strict.—L.D.G.

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What is going on each week in the aircraft factories, on the airlines, at the airports?

What are the characteristics and specifications of the new planes and engines, both military and commercial, which the demands of speed and reliability are bringing forth?

What are the latest approved aircraft equipment, parts and materials? By whom produced?

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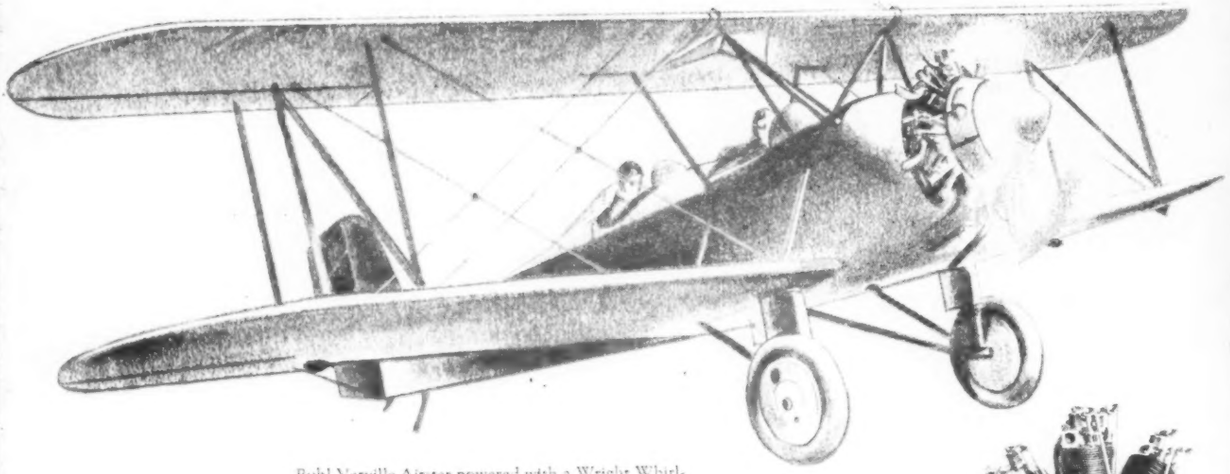

Buhl-Verville Airster powered with a Wright Whirlwind, 200 H.P. Engine. A splendidly built, open cockpit plane for commercial purposes. The Oleo landing gear and folding wings are distinctive. Built by Buhl-Verville Aircraft Company, Detroit, Michigan.

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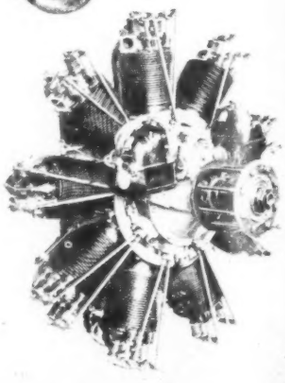

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